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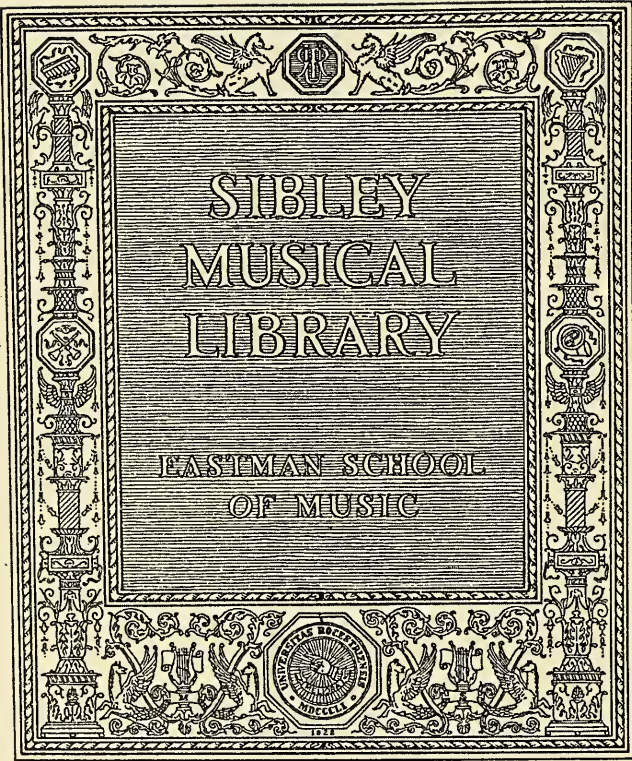
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HISTORY
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THE BOEHM FLUTE.



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HISTORY
OF
THE BOEHM FLUTE,

WITH

DR. VON SCHAFHÜTL'S LIFE OF BOEHM,
AND AN EXAMINATION OF MR. ROCKSTRO'S VERSION OF
THE BOEHM-GORDON CONTROVERSY.

BY

CHRISTOPHER WELCH.

THIRD EDITION,

REARRANGED, ADDED TO, AND PARTLY REWRITTEN.

LONDON
RUDALL, CARTE & CO., 23 BERNERS STREET.

NEW YORK: G. SCHIRMER.

1895.

PREFACE
TO
THE THIRD EDITION.

THIS work did not spring out of either the desire or the design of writing a book on the flute; it was, as explained in the Preface, of fortuitous origin.

It had been written seven years, or more, and had long been dismissed from my mind, when English flute-players were invited to co-operate in bringing about an event which was to them not without interest—the publication of a treatise on their instrument, believed to be the work of a life.

The author, Mr. R. S. Rockstro, was a professional flautist, as well as the projector of a model Boehm flute. To his capacity, to his industry, and to his perseverance, the many flute-players who owed their skill in great part to the excellent instruction for which they were indebted to him, bore ungrudging testimony, whilst the distinction, as a writer on musical subjects, achieved by his well-known and deservedly popular brother,

Mr. W. S. Rockstro, augured well for the success of the work from a literary point of view. As it was thus anticipated that an important addition was about to be made to the flute-player's library, Mr. Rockstro's appeal for subscribers met with a ready response.

The hopes which had been raised were not destined to be disappointed. On the appearance of the volume it was at once acknowledged that the result of the labours of the many years devoted to its compilation had been expressed with a clearness of diction that left little to be desired. Moreover, there awaited us a pleasant surprise; the interest of the work was enhanced by the charm of a lady's hand. For her contribution to their literature, Miss Georgina Rockstro, Mr. Rockstro's talented and accomplished daughter, is specially entitled to the thanks of flute-players.

It was soon observed, however, that the treatise was disfigured by a sad blot. That Mr. Rockstro would not be unmindful of his own efforts to improve the instrument of his choice was to be expected; but he had not stopped there; it was found that he had shown scant sympathy with certain of his fellow-workers, past as well as present, in the field of flute construction.

Of them all, not one was so singled for censure as the man, the record of whose brilliant and enduring services in the cause of flute reform

constitutes the most striking page in the annals of our instrument. If all the calumnies which jealous and malicious tongues have heaped on Theobald Boehm could be justified, he would still have immeasurably higher claims to the gratitude of flautists than any other flute-constructor of modern times ; yet Mr. Rockstro had not only applied contumelious language to his work, and referred in terms of scornful contempt to those who recognised in him a man of superior ability, but, forgetful of the time-honoured adage, *De mortuis nil nisi bonum*, had even gone so far as to charge him with acts of mendacity, duplicity, and treachery, calculated to leave an indelible stain on his memory.

Those who were of opinion that the sanctuary of the grave should have been respected expressed regret that such matters had not been passed over in silence ; but regret deepened into indignation, when, on looking more closely, the tale of a dead man's turpitude, told by Mr. Rockstro, appeared to be nothing more than a work of fiction, which that gentleman had persuaded himself to regard as reality.

It was felt, more especially by some of those the appearance of whose names in the book, as supporters of Mr. Rockstro in his literary venture, might be construed into acquiescence on their part in this ungenerous attack, that a disclaimer was called for on behalf of English flute-players.

As I had already interested myself in the origin of the Boehm flute, appeals were made to me to again come forward, but I was then engaged on more attractive work ; however, after a time I undertook to become the spokesman of the dissentients.

In considering how best to bring the disavowal before my brother flute-players, my first thought was that it should take the form of a pamphlet ; but I afterwards decided to embody it in a Preface to a second edition of my ' History of the Boehm Flute.' When I began to write, it was my intention that the counterblast should not extend beyond ten or a dozen leaves, but my pen travelled on until it had covered more than an hundred pages ; indeed, before I had done, my preface had become as long as, if not longer than, was the work itself in its original form.

The new edition, with its overgrown preface, though printed in 1892, was not in the hands of the public until 1893. Up to that time there had been no communication, direct or indirect, between me and any member of the Boehm family ; but during the course of the year, through the kindness of an ardent admirer of Boehm, Mr. John Finn, whose contributions to musical periodicals are well known to flute-players, I was brought into correspondence with Herr Ludwig Boehm, Theobald Boehm's eldest son. Herr Boehm was so good as to look over some old family papers,

and to furnish me with copies of documents thus brought to light (amongst them Gordon's long sought for announcement of his "Diatonic Flute"), which supplied important missing links in the story, as I had told it, of the instrument which bears his father's name. These documents, which in justice to Böehm I felt bound to make known, have now been incorporated with the work; additions rendered desirable by the newly acquired information have been made to the text, and the contents of the unwieldy preface have been transferred to the body of the book.

PREFACE

TO

THE FIRST EDITION.

AN apology is due to the reader for the un-systematic and desultory manner in which the matter which forms this small volume is put together. The only excuse I can offer is the way in which the little book originated. It was as follows:—

At the close of the year 1881, I wrote, for 'The Musical Standard,' an obituary article on Boehm, of whose death I had then just heard. Soon after it appeared I was asked to write again, and to deal more fully than I had previously with the question, whether Captain Gordon ought, or ought not, to be regarded as the real inventor of the flute attributed to Boehm (an old controversy which had just then been revived, both in England and on the Continent), and, in compliance with this request, I contributed another article to 'The Musical Standard' under the title of 'The Invention of the Boehm Flute.'

I at first intended that the articles should appear either anonymously, or else under the

signature of a *nom de plume*, as had all my previous contributions to 'The Musical Standard,' but the editor thought that they might be more interesting if my name were appended to them, especially as I was one of the last Englishmen, if not the last, who saw Boehm before his death.

I complied with the suggestion he made, and it having thus become known that I was the writer, several brother amateur flute-players, who did not take in 'The Musical Standard,' expressed a wish to have what I had written, so I promised to get a few copies of the two articles printed separately for private distribution. I also determined to take the opportunity of making a revision of the text, rendered necessary by the results of renewed and more careful researches. Moreover, as I had been asked what authority I had for some of my statements, I resolved to add notes, which should consist partly of references and partly of matter, which the limited space assigned to an article in a newspaper had rendered it previously impossible to introduce.

Whilst I was writing the notes, the controversy between the Boehmites and Gordonites was still going on, and it occurred to me that a collection of the chief literary productions which had appeared on the subject would be a not uninteresting appendix to my two articles, and, finally, considering that what I was about to put together

would, with some additions, form a chapter in the history of the flute—a history (however humble the flute may be from a musical point of view) incomparably more varied and interesting than that of any other instrument—I decided to ask Mr. Richard Carte, whom I had to thank for valuable information, to allow the House of Rudall and Co. to be named as its publishers.

CHRISTR. WELCH.

UNITED UNIVERSITY CLUB:

November 1882.

CORRIGENDA ET ADDENDA.

- Page 23, note 7, line 2, *for 8 read 9.*
 „ 38, note 9, line 4, *for 105 read 164.*
 „ 48, line 12, *for Foltz read Folz.*
 „ 109, line 7, *for 1895 read 1896.*
 „ 126, last line of note 6, *for 28 read 38.*
 „ 40, note 17, line 9
 „ 58, line 19 of note
 „ 97, line 10
 „ 114, line 14 from bottom
 „ 173, lines 11, 12, 13
 „ 221, last line of note 51
 „ 226, lines 3, 4, 7 of note
 „ 244, note 70, line 3
 „ 270, note 96, line 7 from bottom
 „ 283, note 109, line 6
 „ 284, note 110, line 26
 „ 369, note 22, line 6 from bottom
 „ 377, note 2, line 5
 „ 388, note 5, lines 3 and 4.
 „ 467, note 44, lines 3 and 4.
 „ 184, line 6 from bottom, *delete I would.*
 „ 199, line 21 of note, *for p. 131 read p. 329.*
 „ 211, line 2, *delete them, and line 4, of them.*
 „ 251, note 76, *for 35 read 351.*
 „ 292, line 10, *for flute-makers' read flute-maker's.*
 „ 302, line 13, *after defective insert as.*
 „ 351, note 4, *for 25 read 251.*
 „ 354, line 8 from bottom } *for Musicalische read Musikalische.*
 „ 363, line 8 from top }
 „ 358, last line, *before commissioner insert a.*
 line 5 from bottom, *for is read was.*

*Square brackets [] should
have been used instead of curved
().*

In pp. 103 and 104 a lithograph is inadvertently termed an engraving, and the lithographer called an engraver.

Should Schafhäutl's experiments with organ-pipes be repeated by a future experimenter, the figures and observations will be examined and tested. It may be well, however, to notice some errors which cannot fail to strike even a cursory reader. For instance, there is an obvious mistake in the last line but one of p. 363: "the G (or more nearly the G sharp of our old high pitch)" What Schafhäutl wrote of course we cannot tell; but, judging from the context, it would seem that he intended to say, "the G sharp of the French pitch (or more nearly the G of our old high pitch)." For "one decimetre" (p. 364, line 5) we should probably read "one centimetre," it being out of the question that the wall of the organ-pipe was one decimetre (nearly four inches) thick. In another place (p. 365, lines 3 and 5 from the bottom) "2 mm." no doubt stand for "2 cm.," and "2 cm." for "4 cm." On the next page, 366 (line 16 from the bottom), is an omission for which my own printers are responsible: "G" should be "G."

In a passage in the Life of Boehm (p. 422, line 15), it has been suggested that the word which Schafhäutl wrote was not "nasty" (*hämisch*), but "namely" (*nämlich*), an emendation which has been introduced into the text.

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PART I.

THEOBALD BOEHM.

AN OBITUARY ARTICLE PUBLISHED IN THE 'MUSICAL STANDARD.'

THE death is announced of this once celebrated flautist at the patriarchal age of eighty-eight.¹ In Germany, fifty years ago, Boehm was considered

¹ It took place on the 25th of November, 1881, and the announcement that he died at the age of eighty-eight went the round of the newspapers. It is difficult to say, however, with certainty whether the statement was or was not correct. If he was eighty-eight at the time of his death he would have been born in 1793, but I have been informed by Mr. John Finn that he has in his possession a letter from Boehm, dated February 8th, 1872, in which he writes, "I was born on the 9th of April, 1794, and so I am too old to make the acquaintance of the present generation." Dr. Schafhüttl in his *Life of Boehm* (*infra*, p. 375) also gives the same date. This would make him eighty-seven at the time of his death. Yet Schafhüttl twice speaks of him as having reached his eighty-ninth year (pp. 374, 475), whilst Boehm himself repeatedly makes statements which involve the admission that he was born in 1793. For instance, writing to Mr. W. S. Broadwood on the 22nd February, 1873, he says, "My health is well enough in general, but my eyes get so very weak that I am scarcely able to read and write. As my eightieth birthday will be in a few weeks, the doctor says, 'That is a malady which cannot be cured!' Nevertheless. I play every morning on my flute in G, and people like to hear it." The following is from another letter, dated the 19th April, 1870: "I am still able to work and play, although I have passed my seventy-seventh birthday." Sometimes, however, he confirms the statement that he was born in 1794. Thus, writing on the 16th of April, 1866, a few days after his seventy-second birthday, presuming that he was born on the 9th of April, 1794, he says, "I am now an old man of seventy-two, and I now play only among friends; but *good* music is still my greatest pleasure in this world." Again, in November 1868, he speaks of himself as "nearly seventy-five years old" (*Essay*

the first flute-player of the time.² He was remarkable alike for his great execution, and the grace and good taste of his style. "D'après les éloges, qui lui sont accordés par les artistes qui ont entendu," says Fétis, "il paraît que Boehm se distingue également et par sa belle manière de chanter *l'adagio* et par le brillant de son exécution dans les difficultés." His works are very numerous, and some of his solos are not unfrequently heard in the concert-room, even at the present day.

But his fame as a performer and composer has been completely eclipsed by his success as an inventor. In connection with this, it is scarcely an exaggeration to say that his name is a household word with every flute-player in the world. So radical were the changes which he introduced, that the flute now in general use may be said to be a new instrument under an old name. When he took it in hand, the flute was not only very

on the Construction of Flutes, p. 54). On the other hand, ten years afterwards, in July 1878, he writes to Mr. Mills, "I am quite well in my old age of eighty-five years" (*ibid.* p. 61). Possibly Boehm may have overlooked the circumstance that a man's birthday is not the day on which he was born, but the anniversary of that day, and that thus a child is one year old on his first birthday. Sometimes, moreover, persons fall into the mistake of believing that they are of a certain age as soon as they have entered, without waiting until they have completed the last year of the series. In this way a man who has only just passed his sixty-ninth birthday, may inadvertently speak of himself as being seventy years old.

² Fétis, in the first edition of his *Biographical Dictionary* (1835, article 'Boehm'), speaks of Boehm as "considéré comme le premier flûtiste de l'époque actuelle, en Allemagne." In the second edition of this work (1860), for "le premier flûtiste" is substituted "un des plus habiles flûtistes."

much out of tune, but scarcely two of its notes were alike in quality or power, some of them being strong and clear, others weak and muffled.³ Several of the shakes, too, were wretched,⁴ and as an instance of their bad effect, it may be mentioned that Nicholson, although his tone was admitted to be better than that of any other player of his day, never made the shake on D, which occurs in the 'Ranz des Vaches,' in the overture to 'William Tell,' without causing a shudder to run through the band.⁵

By adopting two principles, one that the holes should be equal, or nearly so, in size, and the other that the keys when in repose should be open instead of closed, and by constructing mechanism by which these principles could be carried out, Boehm produced such a revolution in the instrument, that one of the jurors⁶ at the Exhibition of 1851 declared that, in comparison with

³ In a pamphlet entitled, *Examen critique de la Flûte ordinaire comparée à la Flûte de Böhm*, Coche prints the scales, and indicates separately each note, which, on the old flute, was either sharp, flat, or feeble, and sums up by saying, "What can be expected of an instrument, which, out of 217 notes, forming the total of the twelve scales, presents almost half of them defective (fausses)?"

⁴ "In a compass of three octaves, the flute of the present day presents forty notes on which one cannot execute a shake without causing a defective sound to be heard."—*Coche*.

⁵ This very imperfect shake attracted the attention of the conductor of the orchestra of the Covent Garden Opera House, Signor, afterwards Sir Michael Costa.

Coche includes it in a list of twenty-five passages, taken from the works of Auber, Boieldieu, Cherubini, Carafa, Ad. Adam, and other distinguished composers, which he brings forward as examples of music which it was impossible to execute in a satisfactory manner on the flute then in use, though written for that instrument.

⁶ This was Berlioz. Mr. Carte, who was present on the occasion,

Boehm's, the eight-keyed flute was only fit to be played at a fair. It must be admitted, however, that Boehm was not so successful with the high notes, from the D upwards, as he was with the two lower octaves. It is true that execution in this region was so much facilitated, that passages, before almost impossible, were rendered comparatively easy; but the tone of most of the notes was thinner and poorer than on the old flute, and their intonation anything but satisfactory, as they became, when forced, much too sharp.

As Boehm's improvements are applicable to the rest of the wood-wind, the oboe, clarinet, and bassoon, surprise has been expressed that they have not been more generally adopted. The explanation usually given is, that it is impossible to improve these instruments; that, with them, improvement would be destruction, as their essential character lies in their imperfections. Perhaps, however, the cause of this absence of reform may rather be traced to the want of a sufficiently large number of amateurs to break down by their influence the conservatism of professional players, and to overcome their disinclination to change. A musician who has spent his youth in learning to conceal the defects of an instrument, has but little inclination to give up the vantage he has gained, nor has he time, amidst the engagements of his professional career, to learn a new system

informs me that he heard him make this observation in French, as he was walking about the room whilst the instruments were being tested. He was making a comparison by playing upon a flute on the old system.

of fingering. Still less can he be expected to place in the hands of a young player, soon, perhaps, to become a rival, an instrument which may be the means of enabling him to come to the front in the race for artistic distinction.

A clarionet⁷ on the Boehm system, modified by Klosé, is in use in military bands in France, and the Boehm oboe was adopted in this country by M. Lavigne, who was so celebrated as a solo player. His execution on it was amazing, and it seemed to have double the power of the old oboe, enabling him to make extraordinary *crescendos* and *diminuendos*. Unfortunately, however, when playing in the orchestra, he did not always refrain from using the extra power he had at his command, and so caused the oboe to unduly predominate. This created a prejudice against the instrument, especially as the characteristic reedy tone was intensified, and assumed a piffero-like *timbre* in the loud sounds.⁸

Having effected a reformation in the holes,

⁷ The mechanism of this clarionet was contrived by Buffet. Klosé pays him the following compliment:—"It is to M. Auguste Buffet, junior, who seized and interpreted my ideas with a rare happiness, that I owe the instrument I now present to artists and amateurs."—Klosé's *Method for the Clarinet*, English edition, published by Rivière and Hawkes.

In England a clarionet on Boehm's principles has been designed by Mr. Carte, and is manufactured by Rudall, Carte, & Co., but it has not come into general use. I have seen a Boehm bassoon, but have never heard of one being played.

⁸ I learn from M. Buffet, who made the instrument on which M. Lavigne plays, that, though it was bored on a model, or bit, as it is technically called, he received from Boehm, the holes, by M. Lavigne's instructions, were made larger than those proposed by Boehm. This, of course, would account for the altered tone.

Boehm next directed his attention to the shape of the interior of the flute, and in 1846 succeeded in his second great achievement—a new bore,⁹ cylindrical in its lower two-thirds, but tapering in its upper part, where it terminates in a truncated cone.¹⁰

At first the new bore met with violent opposition. So great was the prejudice against it, that the late Mr. Clinton declared that, if the cylinder were right, Nature herself must be wrong. However, it soon gained the ascendancy, and before many years even Mr. Clinton began to manufacture cylindrical flutes.

The following are the chief advantages which the cylindrical has over the conical bore:—Greater ease in blowing, less strength of lip being required; greater carrying, or penetrating power, the sound being audible further off, and the tone, to listeners at a distance, being clearer and brighter, as proved by an experiment made in the Albert Hall;¹¹ a better *piano*, the soft tones

⁹ Boehm is said to have made no less than three hundred experiments in connection with this invention. A very interesting account of them is given by him in his pamphlet, *Ueber den Flötenbau und dessen neueste Verbesserungen*, Mainz, 1847, to which, or to the French translation of it, often quoted in this work, entitled, *De la Fabrication et des derniers Perfectionnements des Flûtes*, Paris, 1848, the reader is referred. In 1882 an English version of this work by Boehm himself was published by Messrs. Rudall, Carte, & Co., under the title of *An Essay on the Construction of Flutes*, edited by Mr. W. S. Broadwood.

¹⁰ The termination is not, strictly speaking, conical, but slightly curved. Boehm professed to employ the curve of the parabola, so that the bore at this part may be said, I suppose, to correspond to a truncated parabolic conoid.

¹¹ For an account of this experiment see Note A, p. 14.

being more delicate in quality ; greater certainty in eliciting, and greater ease in subduing, the high notes, which are less liable to become too sharp.¹² In one respect, however, it is inferior : for, in passing rapidly from the higher to the lower part of the instrument, the performer cannot attack, or articulate, the low notes with so much force and firmness.¹³

It has been the subject of a controversy, to which national jealousy has imparted needless warmth, whether Boehm was, or was not, indebted for some of his ideas to a Captain Gordon, a Swiss gentleman of English extraction, who was working, among others, at the same time, with the same object. But however this may be, there can be no doubt whatever but that Gordon adopted some of Boehm's inventions, and even the French admit that two of his keys,

¹² Further remarks on the intonation of the cylinder flute will be found at p. 15, Note B.

¹³ It has been stated that the *son plein*, a quality of tone resembling that of the clarinet, which can be produced in the lowest octave of the flute, is peculiar to the cylindrical bore. This reedy *timbre*, however, can be brought out with quite as much, if not more intensity on the conical flute: it depends, not on the cylindrical shape of the bore, but on the strength of the lip of the performer. Nicholson, who could elicit every variety of tone which the flute is capable of producing, is said to have forced it out in a way never before heard, and hence it was christened the "Nicholsonian effect." It is much cultivated by English flute-players, and those who have strong lips are often very proud of being able to "thrash" the flute, as they term it, and so make it heard. Most of the Continental flautists, however, look upon its use, except to a very limited extent, as an indication of bad style, akin to the questionable taste of some *contralto* singers, who, finding themselves gifted with the faculty of emitting their low notes with great power, never lose an opportunity of forcing them on the ear of the listener.

those for F sharp and the D shake, belong to Boehm.¹⁴

Gordon, who began to make experiments in Paris in 1826, made Boehm's acquaintance in London in 1831,¹⁵ when each showed the other the result of his labours up to that time. Boehm observed that Gordon had lowered and enlarged the E hole, as well as that he had adopted a ring-key.¹⁶ But the idea of this contrivance was not new to him, for he states that not only had he had in contemplation a flute with mechanism based on a system of ring-keys before 1831, but that he had already made, since he had been in London, a model of the new instrument.¹⁷ It was not until he heard the magnificent tone of Nicholson, and saw the enormous¹⁸ holes of his flute, that he began to despair of being able to retain the old fingering.

They parted; Boehm returned home, and in 1832 constructed the flute which bears his name. In 1833 Gordon went to Munich, and from that time the rival inventors appear to have always been on friendly terms.¹⁹ Boehm placed an artisan

¹⁴ *Infra*, p. 126.

¹⁵ *Infra*, pp. 21, 130.

¹⁶ *Infra*, p. 22.

¹⁷ *Infra*, p. 130.

¹⁸ The holes of the flutes made for Nicholson's own use were much larger than those of the instruments sold as "Nicholson flutes." Boehm, whose fingers, though long, were thin and taper, told me that when he attempted to play on Nicholson's flute he found himself unable to stop the holes. He described Nicholson as a handsome man, of commanding stature and muscular build, with a powerful and capacious chest.

¹⁹ It is only fair to mention that, since this article was published in the *Musical Standard*, I have been told by Buffet, who knew both Boehm and Gordon, that they had a violent (*brûlante*) quarrel; but when or where it took place he was unable to inform me.

and a workshop in his own house at the disposal of Gordon, who, after working some months and incorporating in his new production, with the inventor's consent, some of Boehm's fingering, issued an announcement of his flute.²⁰ In 1838 a Frenchman commenced the manufacture of the Boehm flute, which had previously been imported into France from Germany, and, at the same time, the invention was claimed in Paris as Gordon's. A letter was then written to Gordon in Switzerland for information on the subject, but, owing to the state of his health, his wife thought it best to conceal it from him, and to reply to it herself. Her answer,²¹ which does credit rather to her heart than her head, does not throw any new light on the point at issue.

An examination of the engraving,²² representing the ingenious, but practically useless instrument, on which the claim is based, shows that it was larger and much less conical²³ than usual in shape, and that the B flat and F sharp (the latter, as we have seen, taken from Boehm), were produced by the fingers of the right hand, as on Boehm's instrument, though the mechanism by which the action of the fingers is conveyed to the holes to be closed is very different. It may be mentioned,

²⁰ *Infra*, p. 132.

²¹ *Infra*, p. 127.

²² Fig. 12, p. 107.

²³ This departure from the usual conical shape is so marked that, judging from the engraving, one would suppose that Gordon's flute, if not actually cylindrical, presented a distinct approach to the cylindrical form. I am assured, however, by M. Buffet, who knew Gordon and did work on his flute, that this resemblance is superficial only. Gordon's bore was probably funnel-shaped at its lower end, like that of the bass flute represented in Fig. 1.

en passant, that this cross-action of the fingers is a drawback to Boehm's system, and that in the attempts (some of them successful) which have been made by Carte, Briccialdi, and others to make improvements on it, one of the chief objects has been to do away with these objectionable back-fingerings.²⁴

But whether Boehm borrowed from Gordon, or whether the same ideas occurred to both inventors independently of each other, or whether these ideas were derived from some common source, it is certain that to Boehm is due the credit of bringing them into a practical form, and introducing them

²⁴ The numberless attempts which have been made to improve the Boehm fingering, form a practical protest against it. But, notwithstanding all the ingenuity which has been brought to bear on the subject, no progress has yet been made towards what is so much to be desired, namely, a mechanism with a fingering which should be universally accepted, just as is that of the violin or the pianoforte. Much facility, however, has been gained by a return to the closed keys of the old flute, care being taken to guard against inequality of tone by the introduction of duplicate holes covered with open keys. In this way, Mr. Carte, by means of a closed F key, has overcome most of the difficulties of the back-fingering for F sharp, and M. Buffet, by having recourse to a closed B flat key, those of the back-fingering for B flat. The majority of the French players, and Mr. Radcliff and his followers in this country, have returned to the closed G sharp, to the great relief of the little finger of the left hand.

Following out this principle still further, I have designed a flute, which has been made for me by Messrs. Rudall, Carte, & Co., on which all these three closed keys are retained, whilst the system of open holes is in no instance departed from. On this flute there are very great facilities for fingering, and two new and important shakes in the high octave; at the same time the fingering of the old flute is retained for all the notes except one (C natural). Moreover, by the introduction of a piece of new mechanism, each of the upper notes from D to G, both inclusive, is made with only one, and that in every case the correct vent-hole (the fifth below the fundamental note); a result, so far as I know, never before obtained.

to the world. No sooner had his announcement been issued, than Gordon undertook a journey to London, in the hope of getting his flute taken up, but he was doomed to disappointment. He returned to his family in Switzerland much depressed, though he again recovered his spirits. However, two or three years afterwards, in endeavouring to effect, with his own hands, a further improvement in his flute, he had the misfortune to crack it; whereupon his reason, which had been tottering since 1830, gave way, and it was found necessary to place him under restraint.

In early life Boehm learnt his father's business, that of a goldsmith, and the skill he thus acquired in the use of tools was of great assistance to him in his experiments. He employed his inventive power on several other things besides the flute,²⁵ and, for two of his inventions, an improvement in the manufacture of iron, and a method of communicating rotatory motion, he received prize medals.²⁶ He visited England nine times, and spent altogether more than two years in this country. He used to speak with enthusiasm of his reception, and of the kindness and hospitality of his English friends. When the writer had the pleasure of seeing him at Munich in September 1881, notwithstanding his great age, he still held himself erect and walked with a firm step.

²⁵ In the first edition of Fétis's *Dictionary* he is credited with the invention of a new kind of pianoforte.

²⁶ It seems that the "prize medal" which Boehm received for the part he played in connection with the iron industry was a decoration. See *infra*, p. 431, also p. 438.

Of this evidence of a hale frame, so seldom seen in his unwonted years, he was very proud, and he attributed it, as well as his good health and longevity, to his temperate habits; for, without being particularly abstemious, he always avoided excess, especially in alcohol. Although he did not marry until he was twenty-six, he left behind him more than fifty descendants.

NOTE A, page 8.

Mr. Radcliff having an engagement for a concert to be given at the Albert Hall, during which he was to play a solo, a duet with the pianoforte, and an *obbligato* to a song, besides taking part in other music, it was arranged to take advantage of the opportunity to make a comparison between the effect, in this large building, of the conical and the cylindrical flute. Mr. Radcliff was to use sometimes a conical and sometimes a cylindrical instrument, and to prevent those who were to be the judges from being swayed by prejudice, he was not to let it be known beforehand on which of the two he was going to play.

I stationed myself in the gallery, as far as possible from the orchestra, and from where I was placed I soon detected a marked difference between the two flutes. On the one the notes were bright, the rapid passages clear and sparkling, and the tone possessed of that limpid sweetness so characteristic of the flute; whilst the effect of the other seemed, in comparison, to be dull, heavy, and indistinct. Mr. Richard Carte was present in another part of the Hall, and his impression corresponded very much with my own.

At that time I was playing on a conical flute, having left the cylinder for it, being firmly convinced that, whatever difference of opinion there might be as to the effect of the cone close at hand, there could be no doubt of its superiority when heard at a distance. Whenever, therefore, the better effect was produced, I felt no doubt whatever but that Mr. Radcliff was using the conical flute, and great was my surprise on learning from him, after the concert, that I was wrong in every instance.

This experiment seemed to me to be so conclusive that I at once returned to the cylinder, and I have played on it ever since. I believe that Mr. Radcliff now seldom uses a conical flute for his public performances.

I ought to mention that in this trial the cone had more than a fair chance. The conical flute was Mr. Radcliff's own, which he had in daily use; whereas the cylinder was one lent him for the occasion, and it was only placed in his hands a few hours before the concert. Moreover it was on the Boehm system of fingering, a system very different from Mr. Radcliff's, and although this talented artist is gifted with the extraordinary power of being able to play on any flute, no matter what the fingering may be, yet he must have been at a disadvantage when using an instrument to which he was not accustomed.

Both flutes were of wood, with lined heads.

NOTE B, page 9.

Notwithstanding this improvement, the chief difficulties with which the player has to contend as regards intonation still lie in the high octave; and nothing but a correct ear and a good embouchure will enable him to overcome them.

Each note of the second octave is slightly flatter than the corresponding note of the first, but this difference is

so trifling as to be of little practical moment. It is different, however, with the high octave, where many of the notes, unless skilfully blown, become, especially in *forte* passages, unmistakably and painfully sharp. When the air within the flute grows warm, the pitch of the instrument rises, and if the high octave is not more affected than the other two, it at any rate becomes more difficult to control. This, as the temperature of a concert-room is sometimes very high during a performance, adds greatly to the embarrassment of the player. Boehm, who took the utmost pains to endeavour to remedy the defective intonation of the flute, published a *schema* or *diagram*, as he terms it, to enable musical instrument makers to ascertain the theoretically correct places for the different holes; but since the first edition of this work was published, it has been openly stated that flute-makers do not accept it as a guide.

Some improvement may, perhaps, be expected from further experiments with the head-joint,²⁷ the resources of which are probably not yet exhausted; but there seems to be little or no prospect of perfection of intonation ever being attained. To cause the diameter of the bore to vary, as the performer passes from one octave to another, is, of course, an impossibility; nor is it likely that mechanism of any practical use will ever be contrived for keeping the cork in motion whilst the instrument²⁸

²⁷ I am now (1894) in possession of head-joints with which I have much less difficulty in playing the high notes in tune. Moreover, of late years it has been discovered that an important factor in determining the proper position for the holes had been overlooked, so that flutes are now much better tuned than they were in 1882, when this work was written.

²⁸ "Un second inconvénient qui m'obligeait de m'écarter de la théorie, c'est l'impossibilité de faire sur une flûte la distance du bouchon de milieu de l'embouchure en proportion des différentes longueurs des ondulations d'air, parce que, sans un mécanisme extrêmement compliqué et presque impraticable, ni le bouchon ni l'embouchure ne peuvent être faits si mobiles qu'à chaque intervalle cette distance augmente ou diminue selon la longueur inférieure de

is being played, or for opening and closing a set of separate and independent holes, as vent-holes for the high notes.

Many, I amongst them, when commencing the study of the flute, have been misled by the statements of flute-makers regarding the perfection of their respective instruments. Mr. Siccama, for instance, in his 'Theory of the New Patent Diatonic Flute' (London, 1850), thus writes: "Although the flute has always been a popular instrument, scientific musicians have ever regarded it as an imperfect one, on account of its being, in almost every key, out of tune. Many have tried at various times to remedy this defect, and much was hoped for in France from the introduction of the Boehm flute, which, as far as *equality* of tone is concerned, is an improvement on the old plan; but, when examined with respect to correctness of tune, it is very defective; particularly in the higher notes, without taking into consideration the difficulties arising from the complexity of its mechanism. All other attempts in a like manner have only partially succeeded, until it has become the general opinion that this defect of the flute could only be modified, and that it is incapable of being played as perfectly in tune as the violin.

"This imperfection has hitherto formed the great obstacle in studying the flute, for only consummate skill, united with great perseverance and a scientific ear, could enable the performer to arrive at any degree of excellence in the art of flute-playing.

"This subject has occupied the attention of the inventor for some years; and after a very careful investigation of the theory of sounds, and repeated experiments, he has succeeded in producing a flute equal in correctness of tune to the violin. In order to prove this assertion, it

la colonne d'air. Il faut donc trouver pour le bouchon une place moyenne, de telle sorte que les nœuds de vibration des notes les plus élevées ne s'approchent pas trop de l'embouchure et que ces sons puissent encore développer."—*Boehm*.

will be necessary to enter briefly into the subject of Tune." Here follows a mathematical disquisition on the subject of tuning, extending over three pages quarto.

The following remarks, in a very different strain, are from the pen of the late Mr. Clinton :—

"To say that I offer to the public a perfect flute in my recent invention, would be saying more than the flute is capable of being made. No flute is perfect, nor can be ; the principle by which we obtain the sounds of thirty-seven pipes, varying in length and size, from one single tube, precludes the possibility of perfection. Nor do I say that my flute is arranged in consonance with strict acoustical principles, because I am confident so imperfect an instrument as the flute never can be. It is easy to show how the vibrations and the waves of air in the flute are governed by the laws and principles of acoustics, and to the uninitiated ear it smacks in some degree of learning, but it is quite absurd to say that an instrument which, with one tube, has to produce thirty-seven different sounds, and one hole of which (the C sharp hole) I have proved to be connected with the production of so many different notes, can be constructed on true acoustical principles. The flute, by such attempts at refinement, has been lowered to an extent unworthy of it, while no beneficial end has been gained. Mr. Boehm, who for years devoted himself to the study of acoustical laws as connected with the flute, despaired of being able to regulate the instrument by these laws ; the result of his experiments, he says in a letter to me, dated January 1847, is this—that though he sees clearly by the laws of nature why one note or another will not come out freely or in tune, why the octaves are here too flat, here too sharp, &c., he also sees clearly what Savart twelve years before had told him at Paris—*that it is impossible to make a perfect flute.*"—*Treatise on the Flute*, p. 46.

INVENTION
OF
THE BOEHM FLUTE.

BOEHM early evinced a disposition to apply his inventive faculty and mechanical skill to the flute. The manual dexterity he had acquired in his father's workshop enabled him, when quite a boy, to construct without any difficulty a four-keyed flute for his own use. As he grew older, it was his constant endeavour to make improvements in the manufacture of his favourite instrument, and amongst his first applications to the flute, with a view of rendering the instrument less imperfect, may be mentioned new springs, cork joints, leather fittings (*garnitures en cuir*), a sliding embouchure of gold, and other things then not generally used.¹

Finding that he could not get his ideas carried out according to his wishes by the musical instrument makers whom he employed, in 1828 he established a flute factory of his own. He now succeeded for the first time in making a flute with which he was satisfied, and on this he played

¹ *De la Fabrication des Flûtes*, p. 8. *Essay on the Construction of Flutes*, p. 11.

during the professional visit which he paid in 1831 to Paris and London.²

Up to this time his efforts had been directed to the improvement of the eight-keyed flute, but whilst he was in London he reluctantly decided to abandon the old fingering.

What induced him thus to change his views? He shall tell us himself:—

“In this latter city,” he says, “I was struck with the volume of the tone of Nicholson, who was then in the full vigour of his talent. This power was the result of the extraordinary size of the holes of his flute,³ but it required his mar-

² He played in London at one of the Philharmonic Society's concerts, given on the 9th of May. He chose for the occasion his ‘Grande Polonaise’ (Op. 16), dedicated to Camus. His performance is thus noticed in the *Harmonicon*: “Mr. Boehm is a very superior player, with an excellent tone, and his composition was, comparatively speaking, highly respectable; his style differs from that of Nicholson and Drouet, inasmuch as he strives to touch the heart rather than to astonish.”

On May 3rd, he took part in Moscheles' concert, and is said to have played a fantasia “with great ability.” He also played at Moralt's concert (Moralt came from Munich) on May 14th, and at Hummel's on the 20th of June. For other concerts see pp. 399, 435.

³ “The father of the late justly celebrated Nicholson gave greater power to some of the lower tones of the flute by increasing the size of some of the apertures to a most unreasonable extent. We shall shortly see that this process necessarily sharpens the tones of the lower octave more than those of the upper octaves, thereby throwing a still greater inequality into the scales of the instrument and creating the necessity for a greater action and practice of the embouchure.

“It was here that Nicholson greatly excelled; but the instrument was rendered less manageable for all those who did not possess great command of the embouchure, because the means of correcting the defective intonation of the flute are not supplied by the instrument, but are expected from the performer, by a certain alteration of the action and position of the lips and of the force and direction of the jet of breath.”—*Ward*.

vellous skill and his excellent embouchure to mask the want of accuracy of intonation and equality of tone resulting from the position of the holes, which was incorrect and repugnant to the elementary principles of acoustics.⁴ I saw also in London,

⁴ "In every flute made in the usual manner, the low C sharp and E flat apertures are much too low; the E natural very much too high; the F natural is also too high, and the F sharp too low; the G nearly right; the G sharp, A natural, and B flat much too high, and the topmost aperture much too low.

"The necessary evil consequences produced by this improper position of the apertures, are attempted to be remedied, so far as intonation is concerned, by making those apertures which are too high, small in size; and *vice versa*, the apertures too low in position are made large in diameter. But, as may always be predicted in the application of false remedies, the above-named process only very partially relieves one evil whilst it creates another of equal or greater magnitude. As every flute-player is aware, a note determined by a small aperture, even if too high, necessarily yields a paltry, feeble tone; and a too low and large aperture gives a comparatively strong tone. Add to which, there are no apertures provided for the independent production of the second C natural and C sharp, they being made by employing the apertures belonging to other notes, by what is termed cross-fingering. This again being equally a jumbling and confounding of natural laws, gives birth, like the small holes, to a muffled quality and doubtful character of tone. But we appeal to all performers on the best flutes of the usual make, can they produce A, E, C, or other notes, loud, of good quality, and in tune, without so much setting about it and manœuvring, as is utterly impracticable in actual play? We are sure they will answer in the negative; and we are further sure that even Nicholson, with his special flute for his special embouchure, did not and could not accomplish what we have asked. On the contrary, he has left on record the existence of these and similar incorrigible difficulties as necessarily appertaining to the instrument. By stupendous practice of the embouchure, he and other talented performers have undoubtedly produced wonderful and delightful effects upon the flute; but the honest have, at all times, deplored the difficulty of arriving at anything like a performance satisfactory to the musician.

"By that quality of the flute which we have above described, the artful quack has had the means of imposing on the public instruments which he could make appear in tune, obtaining thereby

at this time, an amateur, Mr. Gordon, who had already made numerous attempts at improvement, first at Paris, afterwards in London.

“The E hole on his flute was bored lower down and larger than usual, and, to avoid the lever of the F, he had adopted a ring-key; he had also had made a number of keys and levers ingeniously conceived, but too complicated to ever be of much advantage to his flute, which, moreover, was constructed in defiance of the principles of acoustics, and was, therefore, destined to remain imperfect.

“All this confirmed my conviction, the result of my long researches, that no improvement, really complete, could be brought about without a reform of the system of fingering. I determined, then, to devote my energies to the construction of an entirely new flute, which should combine accuracy of intonation with power and equality of tone, and on which all music written within its compass could be executed.

“On my return to Munich, I set to work. After a careful examination and numerous trials of holes and different kinds of mechanism, I decided on the system of ring-keys as best calculated to fulfil all the requirements, a system which I had already had in contemplation before 1831.”⁵

an exorbitant and iniquitous profit; on the other hand, many have imposed on themselves by supposing that the flutes on which they have witnessed such effects, must be well in tune, and have given large prices to possess them. We have even known instances in which 50*l.* have been given for instruments much worse than ordinary in this respect.”—*Ward*.

⁵ The French from which this passage is translated will be found at p. 149.

As it was during his acquaintance with Gordon in London that Boehm has been accused of appropriating his invention, and as this charge has caused his name to be mentioned with much obloquy, it may be worth while to inquire for a moment what he might have seen on Gordon's flute which he subsequently reproduced on his own.

For instance, did he see open-standing keys? Yes, undoubtedly. But open keys were not a new invention; they existed already on the foot joint of the eight-keyed flute, and on other instruments besides the flute.⁶

Or, again, did he see the fingering which he subsequently adopted? The negative evidence on this point is perfectly conclusive with respect to all the notes except two (C natural and B flat), respecting which some uncertainty prevails.⁷

⁶ This leads to another and still more important question, namely: Did Boehm now see, for the first time, open-standing valves substituted for the closed keys of the eight-keyed flute; in other words, did he borrow from Gordon the idea of the open-keyed system of fingering? In answer to this question, we may say that, although Gordon carried out the system of open keys still more completely than Boehm, for he opened even the E flat key, which Boehm left closed; yet Boehm on his first model (Fig. 8) had already opened one of the keys, that for F natural; he must, therefore, if this model was made before he saw Gordon's flute, of which I entertain little doubt, have been alive to the importance of open keys before he became acquainted with Gordon.

⁷ The matter stands thus: there have come down to us representations of two of Gordon's flutes (Figs. 8 and 12); on one of them (Fig. 12), but not on the other, these two notes are fingered as on the Boehm flute. Now Boehm says (see Appendix, p. 152): "Mr. Gordon made use of essential parts of my instrument in constructing his own, but he always loyally acknowledged it." Gordon did not acknowledge that he borrowed these two fingerings from Boehm, and it therefore seems to be a legitimate inference from Boehm's observation that Gordon did not take them from the Boehm flute.

Boehm arrived at his system of fingering by constructing three models, and then choosing from amongst them, after actual use, that which seemed to offer the greatest advantages.⁸

Then, as regards the most important part of the invention—the ring-keys—Boehm mentions that there was a ring-key on Gordon's flute. But he also states that he showed Gordon a model of his own new flute, which he had made since he had been in London; ⁹ so that he, too, was able, on his side, to produce a ring-key, in an imperfect form it is true, for it wanted the axle, an important part of the contrivance, but still a ring-key, by means of which one finger could close two holes.

When Gordon saw this ring-key his eyes fell on an object which conveyed to him a revelation. Crude and immature as it was, there was disclosed in it the mechanical principle which was destined to revolutionise the flute. This key was literally the key of the invention; it embodied the essence of the device by means of which was rendered practicable a purpose which Gordon, and others

However, since the foregoing was written, Mr. Rockstro has ascertained that the C natural fingering was originated before Gordon's time (see p. 234), leaving one only, that for B flat, to be accounted for.

⁸ "J'avais fabriqué plusieurs plans après de mûres réflexions sur toutes les combinaisons de tons possibles et de mouvements de doigts—car dans de telles choses, ce n'est que la pratique qui décide définitivement—et je fabriquai trois modèles de flûtes construites différemment, parmi lesquelles par l'examen soigneux de tous les avantages et désavantages, il se montra que le modèle de ma flûte comme depuis lors offrait tous les avantages mieux que les autres."
—*Extract from a manuscript given to the Author by Boehm.*

⁹ *Infra*, p. 130.

before him, had been labouring in vain to accomplish, the production of an open-keyed instrument. That the idea seemed to Gordon to be an Eureka, the one thing needful to complete "the means of execution" of his flute, can excite no surprise. Nor is it astonishing that he should have discarded his own ring-key, whatever that contrivance might have been, to substitute for it one constructed after the idea with which he now became acquainted. But what does seem extraordinary, considering the way in which Boehm was so often treated by his brother flute-makers, is that having seen this key, he did not secretly appropriate the idea, convert it to his own use, and then proceed to disparage, belittle and vilify Boehm. But Gordon was a soldier, and, as Boehm testified, "a gentleman in every respect." He was a stranger to the corrupting influence of the spirit of trade, an influence so destructive of the sense of honour. As if he had foreseen that the day would come when the rivals of Boehm would, for their own purpose, credit him with the invention of the Boehm flute, he disclaimed by anticipation a pretension to the honour to be thrust upon him, by inserting in the announcement of his instrument the following words: "*The suppression of the two keys for F natural, and their replacement by one key for F sharp, is an idea the application of which offers great advantages. The idea of this key for F sharp, communicated by Mr. T. Böhm, of Munich, has been, with his consent, adopted for the present flute, of which it completes the means of execution.*"

Gordon imagined that the unsatisfactory action of his keys arose, not from the inherent mechanical defects of his system, but from the difficulty of getting his mechanism properly constructed.¹⁰ Having failed in this in Paris, he had come to London, where he employed two flute-makers, Messrs. Rudall and Rose¹¹ and Mr. Ward,¹² but without success. He then determined to try what Boehm, who had a very skilful workman, could do for him, and in 1833 he went to Munich.¹³ He now saw, for the first time, the Boehm flute, which had been finished in the previous year, and it is only reasonable to suppose that if it had been merely a modification of his own invention, as has been alleged by M. Coche, he would at once have indignantly broken off all communication with Boehm, as a man who had shown himself capable

¹⁰ See Appendix, p. 163.

¹¹ It is a tradition in the house of Rudall and Co., that the former heads of the firm worked for Gordon.

¹² "About the year 1831 we constructed a flute under the direction of Captain Gordon, of Charles Xth's Swiss Guards, who had been experimenting on the matter for some time. In this flute the apertures were placed consistently with the proper length of tube required for each fundamental note in the chromatic gamut; and the captain contrived a method of acting upon the additional apertures beyond the number of fingers. With this flute the captain returned to Paris. Mr. Boehm was at the same time trying to improve the flute or to remodel it; and it is said, with some reason, that he adopted a great part of the captain's contrivance. Upon this matter much has been said and written, and although some points were never clearly ascertained, we must give our decided opinion that Gordon is entitled to most credit in the affair."—Ward, *The Flute Explained*, p. 9.

¹³ "He went to Munich to be near M. Boehm, who had a workman who was the only person who could assist him in the construction of the flute he had invented."—*Madame Gordon's letter*, *infra*, p. 127.

of grossly abusing his confidence ; instead of this, however, the only effect which the new instrument appears to have had upon him was to unsettle his views with regard to his own flute, and to suggest further modifications and improvements.¹⁴ Boehm assigned him a room¹⁵ in which, with the assistance of his best workman, he could make fresh experiments in privacy. He gave him, moreover, every facility for carrying out his new ideas, even permitting him to transfer to his now remodelled flute some of his own mechanical ideas.¹⁶

The following is a more detailed account of Gordon's proceedings at this time.

As Gordon's object in calling upon Boehm in London was to consult him about his flute, we may take it for granted that he mentioned the difficulties he had encountered in getting its mechanism constructed to his satisfaction. We know that he admired the workmanship of the instrument on which Boehm was playing, and that Boehm offered to make a flute for him on his own model ; also that he told him that he, too, intended, on his return home, to construct an improved flute, and that he promised to send him one of the perfected instruments—a remark from which we learn that he had already become dissatisfied with the model he showed Gordon.

¹⁴ See p. 151.

¹⁵ Boehm pointed out to me the situation of this room. It was in the upper part of the house, his workshops being in the story above his flat.

¹⁶ The mechanism for F sharp, and the D shake (see p. 106).

Boehm left London for Munich, and, shortly afterwards, Gordon returned to Paris. Here he saw both Drouet and Tulou. Drouet expressed his approval of his flute, but would not hear of a change of fingering. Tulou¹⁷

¹⁷ Gordon does not seem to have met with much encouragement from Tulou, if we may judge from the following, which I take from the preface to the *Method* of that great artist. After alluding to the circumstance that different systems had of late years been applied to the flute, he goes on to say: "The first trial was made by one of my pupils named Gordon, a captain in the Swiss Guards in France. I had to regret that I could not give that zealous amateur the approval he expected. His flute transgressed, in my opinion, by the principle on which it was founded. In fact, Gordon had taken for a basis the harmonic sounds, a thing to be avoided on instruments pierced with holes, if one desires to preserve their characteristic quality of tone. The flute requires a tone mellow in the *piano*, thrilling and sonorous in the *forte*. Gordon's instrument, on the contrary, had a dry (*maigre*) tone, without fulness (*rondeur*) which came far too near that of the hautboy. It is on this first idea that the Boehm flute has been conceived. The author of this new instrument, a man of great intelligence, has sought how to best turn to account the system of his predecessor. He has perfected it; but although he may have brought about happy modifications, he has neglected two essential points, namely: the preservation of the tone, and the simplicity of the ordinary fingering. . . . It is of fundamental importance to preserve for each instrument the difference of *timbre* which is peculiar to it; for it is this very difference which constitutes in great part the charm of music. Each instrument has its place and its special merit; for instance, if the flute solo which Gluck has used in his opera of *Armida* to accompany the slumber of Renaud, was played on a hautboy, what would happen? The sweetness which the composer has desired to give to this piece would completely disappear. Well, then! I am convinced that the result would be the same with the Boehm flute. . . . Let us seek for ameliorations of use, let us remedy, if it is possible, the defects which can be discovered, but let us preserve the pathetic and sentimental tone of the instrument. What is the first requisite for a singer? a beautiful voice; for a flute-player, a fine tone. When an artist does not possess this qualification he plunges into a torrent of difficulties to obtain applause. To play with ease that which is difficult is without doubt a merit, but it is not the only object at which one ought to aim. In art,

was opposed to it just as decidedly. He now employed himself in constructing a flute, for he was learning the art of flute-making.¹⁸ About the 1st February, 1833, he went to Lausanne, whence, on the 15th of that month, he wrote to Boehm, as follows :—“ I returned home to Lausanne a fortnight ago, after a pretty long sojourn in Paris, whither I went from London shortly after I saw you there, when you started for Munich. I have not lost my time, and I have been working assiduously at a new flute, which I have made myself, as well as I could, and which I have just finished.

“ I have not forgotten you, and I have been constantly expecting that you would send me an improved flute, such as you purposed making on your return to Germany. In accordance with your offer in London, I wish to send you my flute, begging you to make me a fine instrument on its model, seeing that I am in possession of the whole of the fingering for playing it.”¹⁹

In his reply to this letter, Boehm said that it would be better for Gordon to come to Munich, and Gordon took his advice.

During the first week in May Boehm set out for England with his new flute.²⁰ On the 15th of

with the flute especially, ‘Tis charming!’ is an exclamation it is worth more to call forth than ‘Tis astonishing!’”

¹⁸ His good wife, with pardonable pride, believed that he ultimately became really very expert; but if the flute represented by Fig. 9 is either the original, or a copy of that which he made in Paris at this time, it is certain that he still had much to learn.

¹⁹ The original will be found at p. 95. ²⁰ *Infra*, p. 278.

July, whilst Boehm was still in London, Gordon wrote from Munich to M. Mercier, of Paris,²¹ telling him that he had just had made, by a clever artisan, an excellent instrument on his model. He enclosed to him some copies of a printed paper or circular, announcing the invention, with the request that he would distribute them in Paris. They were to be delivered to Tulou, Drouet, Fétis, Jeannet and Cotelte, the well-known publishers, and others of note connected with music. He added that he was about to start for London, and he gave him his address there (22 Newcastle Street, Strand), so that he might be communicated with in case any amateurs should make inquiries in response to his announcement.

He imagined that, as soon as his "beautiful instrument"²² became known, players would flock to purchase it, and it was his dream, after taking out a patent, to establish, with the assistance of Boehm's workman, manufactories in London, Paris, Vienna, and the other chief cities of Europe,²³ and so to realise an income to replace that of which, through no fault of his own, he had been deprived.²⁴ Alas, poor man! he knew nothing of the world, and little thought that, even if his invention had been all he fondly believed it to be, it would still be necessary to set in motion hidden wheels to launch it and keep it afloat amidst the billows of prejudice and interest.

Gordon remained in England until his stock of money was exhausted, and then rejoined his wife

²¹ *Infra*, p. 132.

²³ *Infra*, pp. 127, 131.

²² *Infra*, p. 127.

²⁴ *Infra*, p. 127.

and children at Lausanne, wofully disappointed at his want of success.²⁵ Indeed, it appears to be not improbable, judging from an expression used by Madame Gordon, that he was suffering from an attack of melancholia. However, he threw off his despondency, and it seems that he returned to Munich and resumed his flute-making, for Boehm offered to produce evidence to prove that he was there in 1834.²⁶ His stay at Munich is variously stated at six, nine, and twelve months. If we regard his visit to London as a break in his residence there, it may serve possibly to account for the discrepancy.

We must now pass over a period of four or five years. In the interval Gordon had lost his reason. The Boehm flute had been slowly but steadily gaining ground, particularly in France. A demand for it was springing up in Paris, and in 1838, M. Coche, professor of the flute at the Conservatoire, entered into an arrangement with M. Auguste Buffet, jeune, a Parisian musical instrument maker, to establish a Boehm-flute manufactory. Boehm had not protected himself by a patent, so that there was nothing to stand in his way; and accordingly he assured the public that Boehm's flute had been copied "with an exactitude truly scrupulous," though, as a matter

²⁵ See Madame Gordon's letter, p. 127.

²⁶ Schafhäutl in his *Life of Boehm* (p. 420) says that Gordon was so dissatisfied with his flute that he did not go to London in July 1833, but gave up his intended journey and remained at Munich until March 1834. In another place he states that Gordon did not arrive at Munich until July 1833 (p. 164). In the present state of our information the task of reconciling the conflicting statements as regards dates appears to be hopeless.

of fact, certain changes of more or less importance had been made in the instrument.

In order to ensure the sale of his flute, he had recourse to an expedient, which, however clever it might have been as a mode of puffing, raised a great prejudice against Boehm. He published an engraving, representing three flutes side by side. They were styled respectively, Invention, Modification, Perfectionnement. The first designation was applied to Gordon's, the second to Boehm's, and the third, it is needless to say, to his own flute. Now, had he wished to show that the invention originated with Gordon, he should, of course, have selected for his illustration one of Gordon's early instruments, before he had been influenced by Boehm; instead of this, however, his drawing represents one of Gordon's later flutes, to which he had applied Boehm's fingering, and hence this engraving has proved an endless source of error and confusion.²⁷ Surely, however, M. Coche, who was deriving a profit from Boehm's invention, should have been the very last to raise the cry of "Wolf!"

As for Gordon, his bravery, his simplicity, his misfortunes, his ingenuity, and his perseverance gained him many friends, and excited universal sympathy. No one speaks more highly of him

²⁷ In the second part of this work (p. 273) this engraving is reproduced as it appears in Coche's *Method*; to this, however, is appended the following footnote: "(N.B.) *La Clé du Fa \sharp et la Clé du Trille du Ré appartient à M. Boehm.* (Tablature Gordon)." In Coche's pamphlet there is another of these engravings representing the three flutes, without any such explanation, but instead of it a mercantile announcement relating to the moderation of the price of Coche's flute. See *infra*, p. 148.

than Boehm. When expressing his regret, as he does in defending himself, that Gordon's lips were sealed, those lips which alone could free his character from the calumnies with which it had been assailed, he says of him that he was as honourable as he was modest.

In the Revolution of 1830, when Charles X. lost his throne, and Gordon's professional career was brought to a close, his reason sustained a shock from which it never quite recovered. On Thursday, the 29th of July, the Swiss Guards, in which he held a commission, were suddenly seized with panic in the courtyard of the Louvre, which they had bravely defended all the morning, and made a rush, pell-mell, for the portal leading into the Place du Carrousel. Those who failed to get through were quickly despatched by the rebels, who, in the demoniac frenzy which breaks out at such times, instantly stripped the bodies of the fallen soldiers, placed their helmets on their shaggy heads, and arrayed themselves with tattered fragments of their gory uniforms.²⁸ Mr. Cornelius Ward, the inventor of Ward's Patent

²⁸ "The Tuileries Gardens in Marmont's rear were thus left unprotected; and the marshal, to provide their defence, was obliged to recall one of the Swiss regiments, which then guarded the Louvre. The commander thought it best to send away that regiment which had all the morning resisted the assailants from the colonnade, and to replace it by the other which occupied the great court. Orders to this effect being given, the Swiss soldiers manning the colonnade withdrew with alacrity, whilst those who were to replace them proceeded to do so with no alacrity whatever—so much so, that the colonnade for an interval remained undefended. The people behind the barricade opposite were not slow to perceive the suspended fire. The boldest advanced to the gate of the Louvre, near which a wooden trough for shooting rubbish was left standing,

Flute, who made an instrument for Gordon in 1831, says of him: "He was considered to be of unsound mind, and that he was thus affected on account of the defeat of his comrades, and his own loss of fortune, in the Revolution of July. He was generally treated with consideration on that account; but very little attention was paid to his flute mania, such being the light in which his views respecting the flute were regarded." But he adds—"We consider it due to Captain Gordon, to state, from our own personal knowledge, that he was an ingenious, rational, and kind-hearted gentleman."²⁹

His affectionate wife relates in touching language,³⁰ how no sooner was his flute finished, than he went from Munich to London to bring out his invention; how, owing to his retiring disposition, his inexperience of the world, and his want of introductions, he saw his pecuniary resources melt away before he had succeeded in

and afforded a communication with the colonnade above. Some of the mob soon climbed it, rushed through the apartments of the Louvre, and showed their shaggy heads and menacing guns through the windows. The Swiss soldiers still in the court perceived this, and cried out that the palace was taken; in a trice a panic seized them, and all who could fled through the portal into the Carrousel. The mob, still more alert, had already broken in, and little mercy was shown the unfortunate Swiss who remained behind. In a few minutes their naked bodies covered the court, whilst red fragments of their uniforms adorned the breasts, as broken helms the heads, of the victors."—Crowe's *History of France*, vol. v. p. 401.

"By a strange coincidence they passed over the same spot where their predecessors had gloriously fallen on the 10th of August 1792.—Alison's *History of Europe*, vol. iii. p. 531.

²⁹ *The Flute Explained*, p. 10.

³⁰ In her letter to Coche, p. 127.

making himself known ; how he returned to her and his children at Lausanne, ill and disheartened ; how afterwards, in endeavouring to make his flute still more perfect, he cracked the instrument, which had cost him so much pains and so many sleepless nights ; how, though overwhelmed with distress, he set to work with unabated ardour to construct another ; and, finally, how the difficulties he encountered, all unaided, in the undertaking, added to the opposition and hostility his schemes had raised against him, brought about, by little and little, an alteration in his intellectual faculties.

R I S E
OF
THE BOEHM-GORDON CONTROVERSY,

With an inquiry into the origin of Ring-keys.



THE creed of the Gordonites is embodied in a sarcastic taunt addressed to Boehm by M. Coche, Professor of the Flute in the Conservatoire of Paris, by whom a claim on behalf of Gordon was first advanced. "They say in musical society (*le monde artiste*)," he wrote, "that the flute which bears your name was discovered by a person of the name of Gordon, an old pupil of Drouet."¹

On the other hand, the learned Carl von Schafhützl, "Doctor and Professor in the Royal Bavarian Academy, University, and Conservatorium," Boehm's mathematical tutor and friend for upwards of half a century, thus propounds the belief of the Boehmites, of whom he is the champion: "That such a man [as Boehm] should have borrowed from others the ideas upon which he founded the construction of his instruments, is what no one can seriously believe."²

As is often the case where such wide differences of opinion exist, the truth lies between these two sweeping assertions.

¹ *Infra*, p. 160.

² *Infra*, p. 166.

To say that the Boehm flute was discovered or invented by Gordon would be an exaggeration, even if it could be established that he was the originator of the ring-keys, as is assumed by Coche,³ and of the open-keyed system of fingering, as is asserted by Clinton;⁴ but as these two statements, as has been seen,⁵ cannot be substantiated, the expression warrants the use of still stronger language.

Boehm, however, admits⁶ that one of the two causes⁷ which operated in inducing him to abandon the old familiar fingering, was the impression he received, on seeing the ingenious attempt at improvement which Gordon showed him, when he called upon him, during his visit to London in 1831, to consult him upon the manufacture of his flute. That Gordon exercised an influence on Boehm is therefore undeniable; but to what extent he influenced him will now never be known with certainty. Many are the surmises and conjectures which have been made on this subject. In support of one of them, some show of reason has certainly been adduced (p. 23); and it will presently be seen that Boehm's ideas regarding the reformation of the flute underwent a material change, to whatever cause it may be assigned, about the time he became acquainted with Gordon.

³ *Infra*, p. 126.

⁴ "We find, practically, there are but two systems of fingering in existence; that of the old eight-keyed flute, and that of Gordon, known in this country as the Boehm flute—the former being on the *shut*, the latter on the *open-keyed* principle."—Clinton's *Hints to Flute-players*, p. 1. ⁵ *Supra*, p. 23. ⁶ *Supra*, p. 22.

⁷ The other being Nicholson's flute with its large holes and powerful tone.

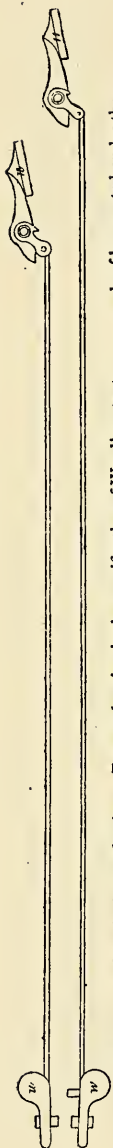


Fig. 1.—Crank and wire mechanism. From a drawing in the specification of Ward's patent. *n, w*, ends of keys acted on by the left thumb, the action carried by wires and cranks to *13, 14*, the valves for the low C sharp and C natural.

A most novel and, as far as is known, original part of Gordon's invention was a plan for carrying the motion of the fingers from one part of the flute to another by means of wires and cranks, or angular levers (the same in principle as those used in bell-pulls) attached at one end to the valves to be acted upon, and at the other, either to terminations representing the ends, tails,⁸ or touches of the keys of the old flute, or else to crescentic expansions partly encircling the holes.⁹ By this means, the pressure of the finger was communicated to a crank, which pulled a wire, and this, in turn, acted on another crank, which set the valve in motion.¹⁰

⁸ Fig. 12, p. 107, *l, m, n*.

⁹ Fig. 12, *r, s, g*. According to Schafhäütl, Gordon took the shape of these crescents from that of the waning moon "five days before the new moon" (p. 105); but Mr. Rockstro has traced the crescent to Dr. Pottgiesser, who published a drawing of a crescent-key (figured at p. 83) three years before Gordon commenced his experiments.

¹⁰ These wires and cranks may be seen on Ward's patent flute. On this instrument the low C and C sharp valves are closed by the left thumb, and consequently the action has to be carried a very long distance. For this purpose Ward has adopted Gordon's contrivance, but for the rest of his mechanism he has recourse to the usual rods or axles and ring-keys (see p. 281). Two of his keys, those for G sharp and E flat, are on the objectionable double-action Dorus plan, first devised by Gordon.

Although Gordon employed the best workmen he could obtain in Paris and London, he failed to get his mechanism constructed in such a way that it would act with sufficient certainty to admit of rapid execution ;¹¹ but, notwithstanding its failure, he clung to it with extraordinary tenacity. He was ready to take Boehm's advice on other points, but he was obstinately bent on following out his own ideas as to the mechanism of the keys.¹² He adopted Boehm's fingering for F sharp, but he rejected the three rings of the mechanism by which this note was produced, and substituted for them three of his beloved crescents ; and even Boehm's little D-shake key reappeared on his flute mounted with two cranks and a wire.¹³

The crescents had this in common with the ring-keys employed by Boehm :¹⁴ they enabled a finger, when closing a hole, to close, by the same movement, one or more other holes, not necessarily close together, so that one finger could do what it had previously required two or more to accomplish. Now as this power, which virtually increases the number of the fingers, lies at the foundation of the Boehm system of fingering, and constitutes an essential part of the invention, it becomes of importance to trace with care the origin of ring-keys.

First, then, the ring-keys have been supposed to be only a modification of Gordon's crescents. It has been thought that Boehm, seeing Gordon's ingenious but clumsy device, seized his idea,

¹¹ *Infra*, p. 127.

¹² *Infra*, p. 130.

¹³ See Fig. 12, *a*.

¹⁴ See his flute, Fig. 11.

developed the crescents into rings by extending them round the holes, and substituted improved mechanism for the unsatisfactory wires and cranks.

This is the explanation¹⁵ put forward by Coche, and it has been accepted, without examination or inquiry, by Fétis,¹⁶ Tulou, Berlioz, and others,¹⁷ who have written on the subject.

Coche, however, brings forward nothing in proof of his assertion, but assumes that, as Gordon was the first in the field, the crescents must necessarily have given rise to the rings. His argument, if argument it can be called, appears to be this: Gordon made crescents before Boehm made rings; therefore the crescent is the parent of the ring.

It would not be difficult to show the illogical

¹⁵ See the extract from his pamphlet, given in the Appendix, p. 126.

¹⁶ *Biographical Dictionary of Musicians*, 2nd edition (articles 'Boehm' and 'Gordon').

¹⁷ "Le premier essai fut tenté par un de mes élèves nommé Gordon, Capitaine aux Gardes Suisses en France. . . . C'est sur cette première donnée que la flûte Boehm a été conçue. L'auteur de ce nouvel instrument, homme d'une grande intelligence, a cherché quel était le meilleur parti à tirer du système de son devancier. Il l'a perfectionné; mais, bien qu'il soit arrivé à d'heureuses modifications, il a négligé deux points essentiels, savoir: la conservation du son et la simplicité du doigté ordinaire."—Tulou, from the Introduction to his *Method*. "This instrument (the flute), which for a long time remained imperfect in many respects, is now—thanks to the skill of certain manufacturers, and to the system of fabrication pursued by Boehm, according to the discovery of Gordon—as complete, as true, and of as equal a sonority as could be desired."—Berlioz on *Instrumentation*, p. 116.

"L'idée de Gordon, exploitée et modifiée par Théobald Boehm, donna naissance aux flûtes à anneaux."—Chouquet, *Catalogue of the Museum of the Conservatoire of Paris*, p. 62.

Compare Grove's *Dictionary of Music and Musicians* (articles 'Flute' and 'Gordon').

nature of such a position as this, and we know that it was Gordon's habit to replace rings by crescents; it is, however, unnecessary to discuss the question further, because there is good reason for believing that Boehm had made rings before he saw the crescents on Gordon's flute.¹⁸

Secondly, Schafh autl and his followers would have us believe that the ring-key was an original idea of Boehm.

I find, however, no countenance for this view in the account given by Boehm of the first construction of his new flute. He speaks not of *inventing* the ring-keys, but of *deciding on* and *choosing* them. He says: "On my return to Munich I set to work, and after a careful examination and numerous trials of ways of boring holes¹⁹ and different kinds of mechanism, I *decided on* (*je me fixai  *) the system of ring-keys as best calculated to fulfil all the requirements--a system which I had already had in contemplation before 1831."²⁰

Again: "The position of the holes being new, a new fingering was requisite.

"This task was the more difficult to accomplish, as the thumb of the right hand serving to hold the flute only, there remain but nine fingers for fourteen holes. It was necessary to combine mechanism which should make up for this

¹⁸ See *supra*, p. 24.

¹⁹ "*Ways of boring holes.*" I have translated the word "*perces*" in this way, because the context shows that Boehm does not refer to the bore of the interior of the flute. He probably contemplated the idea of boring the holes obliquely. (See *infra*, p. 78.)

²⁰ For the original French, see *infra*, p. 149.

disproportion, and I *chose*, after a mature examination, ring-keys.”²¹

If this is not the language of an inventor, an expression which Boehm uses in speaking of the mechanism he saw on Gordon's flute, when it was first shown to him in London, in 1831, is still more significant. “The E hole of his flute,” he remarks, “was bored lower down and larger than usual, and, to avoid the lever of the F, he had *adopted* a ring-key. He had also made a number of levers *ingeniously conceived (imaginés)*.”

It will be observed that Boehm does not say that Gordon had *conceived* his ring-key, but that he had *adopted* it; a term implying that, in his opinion, it was not an original but a borrowed idea, and involving the admission that he knew of a source from whence it might have been derived, although Gordon had constructed it before even the first model of the Boehm flute had been made.

Thirdly: The view I am inclined to take as most consistent with all the facts of the case, as far as they are at present known, is that ring-keys existed before either Gordon or Boehm undertook the reformation of the flute; but their value not being as yet recognised, they had not come into use, but had remained comparatively unknown,

²¹ “La position des trous étant nouvelle, il fallait un doigter nouveau.

“ Cette tâche était d'autant plus difficile à accomplir, que le pouce de la main droite servant exclusivement à maintenir la flûte, il ne reste que 9 doigts pour 14 trous. Il fallait combiner un mécanisme de clefs qui suppléât à cette disproportion, et je choisis, après un mûr examen, des clefs à anneau.”—*De la Fabrication des Flûtes*, p. 18.

until their importance was practically demonstrated by Boehm. If this supposition should be correct, their origin is involved in obscurity ; but in tracing the history of an invention, we often find that it is preceded by ingenious attempts, which come near, without actually attaining the end aimed at, but which subsequently serve the inventor as stepping-stones to enable him to reach the goal he has in view.

In connection with the mechanism of the flute, we may instance, as one out of many, an improvement of which we catch a glimpse in a passing notice by Ward, made by a person whose name he does not think it worth while even to mention.²² The abortive efforts of Gordon also properly belong to this class, and his name, too, would probably have been forgotten long ago, had it not been rescued from oblivion and brought into undue prominence by Coche. I am disposed to think that it is to some one of the many unknown workers in this field that the first idea of a ring-key should be attributed, and that the way had thus been paved for a man of genius ; the materials were lying ready for his hand, and what

²² "The first truly scientific remodelling of the flute with which we are acquainted, was made in 1803. It was a great improvement on the ordinary flute, inasmuch as the apertures were placed more nearly in accordance with the acoustical principles of the instrument. The manner of acting on the extra apertures was not, however, so complete as could be desired, from the want of a little mechanical skill in the party who devised it. We have one of these flutes at present by us ; but, notwithstanding its superiority, it never came into use, from the obstacles before alluded to, and because the time had not then arrived when such an important improvement would be appreciated."—Ward, *The Flute Explained*, p. 9.

Boehm did was to fit the crown to an arch, to which many builders had each contributed a stone.

I had thus come to the belief that ring-keys were of earlier origin than is generally supposed, and had written the above, when I began to make search, in the hope of finding them on an instrument of a date anterior to that of Boehm's invention. I commenced in London, but not meeting with success, I made, during a visit to Paris, an examination of the extensive and interesting collection of flutes, hautboys, and other wind instruments in the Museum of the Conservatoire; every facility for doing so having been most courteously afforded me by the amiable and learned Curator, M. Chouquet.

I was still unsuccessful; another day, however, when calling on M. Buffet jeune, so well known as the maker of Coche's flute, I took the opportunity of asking him if he had any knowledge of ring-keys before he saw them on the Boehm flute. He replied that, in the year 1826, he had in his hands a clarionet on which there was a ring-key. This clarionet, he further informed me, had been made by Lefèvre, and belonged to a M. Blève, a clarionetist of Havre. He was quite sure that Berr knew of the existence of this ring-key, for it had subsequently formed the subject of a correspondence between him (Buffet) and Berr; but Berr did not adopt it because he considered the old plan preferable.

The next day, acting on a suggestion of Buffet, I went to see M. Biè, the successor of Lefèvre, but he was not able to give me any further

information, the circumstances to which I referred having taken place before his time. Afterwards, however, I most unexpectedly obtained a clue to M. Blève himself.

Whilst conversing with M. Chouquet, I happened to mention what Buffet had told me, and he informed me that, in his youth, he had resided at Havre, and that he was acquainted with M. Blève. He said he believed that, though very old, he was still alive, for he had met him not many months ago; he had retired from the musical profession, and was living in Paris.

I now returned to Buffet, and told him what I had heard. He recollected that he had the address of a son of M. Blève, and he was so good as to write to him; but he received no answer to his letter. However, although I thus lost all hope of becoming acquainted with the particulars of the contrivance used by M. Blève, afterwards, when ransacking the records of the Patent Office in London, I came upon the description of a ring-key in the specification of a patent taken out in 1808, a time when Boehm and Gordon were boys. As this work, though nearly ready for the press, was not in the printer's hands, I was able to include a drawing and a description²³ of it. It throws a light on the origin of the rings; they were at first, not crescents, but perforated keys.

Boehm completed his flute in 1832. His first recorded appearance with it in public was on the 1st of November²⁴ of that year. By the following

²³ *Infra*, p. 79.

²⁴ *Infra*, pp. 253, 418.

spring he had mastered the difficulties of the new fingering, and had become a brilliant executant, as is evident from an account which has come down to us of a concert given at Munich on the 25th of April, 1833.²⁵ About a week afterwards he started for London, where he stayed nearly two months and gave English flute-players an opportunity not only of hearing but of examining the new instrument, for he exposed it for sale at Gerock and Wolf's²⁶ shop in Cornhill.

In the following year, 1834, Boehm again came to England. He travelled *viâ* Paris, and reached London towards the end of July. It would seem that when he left Munich he did not contemplate a long absence from home, for his passport was taken out for three months only; but circumstances occurred which induced him to remain in this country for nearly, if not quite a year. An invention of his friend, Dr. Schafh utl, connected with the construction of the pianoforte, had been patented by Gerock's partner, Robert Wolf. The patent having become the subject of litigation, Schafh utl's presence was required in England, where he joined Boehm in the month of October.²⁷ The current of Boehm's thoughts was now turned from the course in which it was running into a very different channel; his mind was diverted from poetry to prose, from music to the production of iron. This subject was not new to either Boehm or Schafh utl; they had not only made a study of it, but had set up an experimental furnace in the neighbourhood of Munich with a view of

²⁵ *Infra*, p. 251. ²⁶ *Infra*, p. 277. ²⁷ *Infra*, pp. 352, 427.

endeavouring to discover a method of smelting which would enable a Bavarian nobleman to utilise a deposit of ironstone which had been found on his estate. During a previous visit to this country, Boehm had been favoured with the entrée to some English ironworks; a privilege which he was in a position to extend to Schafhäutl. The two friends were thus brought into connection with an ironmaster, who became interested in their ideas and encouraged them to resume their investigations. The experiments were now made on a larger scale, and resulted in an improvement in the manufacture of malleable iron which was patented in Schafhäutl's name. As the patent was not taken out until May 1835, it would seem that the greater part, if not the whole of the winter was devoted to the work which led to the discovery. Nor was this the only distraction calculated to take Boehm's attention from music. It was during this visit to England that he made the model of his invention for communicating rotatory motion, for which he received a medal from the Society of Arts; moreover, it seems not unlikely that three overstrung pianofortes (Boehm was the inventor of overstringing), a piccolo, a cabinet, and a square²⁸ were made at Gerock and Wolf's in 1835. The flute, however, was not entirely laid aside; we are told by Clinton that Boehm played several times in this year;²⁹ on one of these occasions Ward was present, as we learn from his letter to the 'Musical World.'³⁰ Still Boehm was so far

²⁸ *Infra*, p. 180.²⁹ *Infra*, p. 277.³⁰ *Infra*, p. 330.

prevented from making it known that up to the end of 1835 he is said to have sold but one instrument in this country.

In June Boehm returned to Bavaria. The next summer, that of 1836, he was again in London, where he played at a concert given on the 17th of June in aid of the New Musical Fund.³¹ Other visits were paid to England in 1837 and 1839. We have evidence that in the last-named year the new flute was beginning to make way: Card was interesting himself in it, and Signor Foltz was playing solos on a Boehm flute made in London by Ward.³² We next hear of the instrument being taken up by two English players of distinction, Messrs. Carte and Clinton. Mr. Carte claims to be "the first native professor to perform on it in public,"³³ whilst Clinton states that he adopted it for his own playing and proceeded to introduce it as early as 1841,³⁴ and also that it was he who induced Messrs. Rudall and Rose, the leading English flute-makers of the time, to undertake its manufacture.³⁵ But however this may be, it is, I believe, undisputed that by 1843 both Carte and Clinton were playing, and giving lessons on the new instrument, that Clinton's 'Essay on the Boehm Flute,' was published, and that Messrs. Rudall and Rose were engaged in making Boehm flutes, Grevé, Boehm's skilful and experienced foreman, having

³¹ *Infra*, p. 435.

³² Ward's letter to the *Musical World*, p. 329.

³³ Carte's *Sketch of the Flute*, p. 26.

³⁴ Clinton's *Treatise on the Flute*, p. 21.

³⁵ Clinton's *School for the Boehm Flute*, Introduction.

come over to England to instruct their workmen.³⁶

It was introduced in France somewhat earlier. On his return home from London in 1833 Boehm had passed through Paris, where he appears to have made his flute known to Farrene, Camus, and Laurent, flute-makers of the Palais Royal.³⁷ Other flying visits to Paris were paid in 1834 and 1836, but we have no record of any instruments having been sold on either of these occasions. However, in the year following, 1837, Camus, the first flute at the Italian Opera, an old friend of Boehm,³⁸ brought a Boehm flute to Paris. He had, it seems, been commissioned by Boehm not only to act as an intermediary in procuring flutes from Boehm's factory for purchasers in France, but also to enter into arrangements for the manufacture of the new instrument in Paris. Buffet became acquainted with the flute thus brought to Paris by Camus; indeed, according to Buffet's statement, it was placed in his hands by Camus himself. This clever maker, who, next to Boehm, has played the most important part in the attempted reformation of wood-wind instruments, subsequently made and patented important improvements in the mechanism, three of which are in universal use at the present day.³⁹ It

³⁶ Carte's *Sketch of the Flute*, p. 19.

³⁷ Boehm's letter to Coche, p. 131.

³⁸ The *Grande Polonoise*, played by Boehm at a Philharmonic Concert in London, on May 9th, 1831, published by C. Gerock & Co., 79 Cornhill, was dedicated to "his friend" Camus.

³⁹ They are: 1. The "needle-springs." 2. The "clutches," or pieces of correspondence, to supersede the arms employed by Boehm (see Fig. 36). 3. The "sleeves," or cylindrical tubes encircling the

appears, however, that Camus did not come to an understanding with him for its manufacture, but entrusted its construction to another Parisian instrument-maker, M. Clair Godefroy.

In the spring of this year, 1837, Boehm, while spending a few days in Paris, on his way from

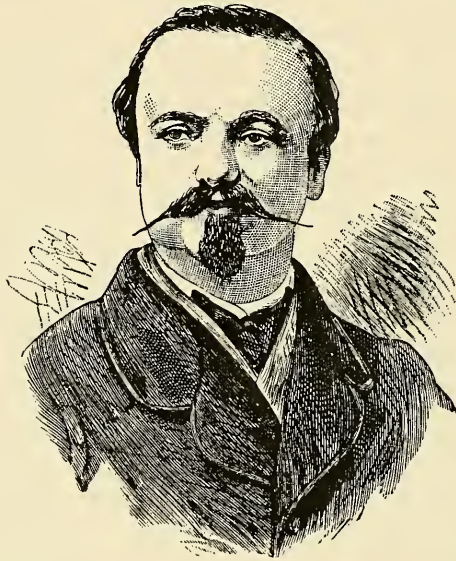


Fig. 2.—Auguste Buffet jeune, from a photograph taken in 1862.

Munich to London, took the opportunity of showing his flute to Savart, one of the greatest authorities on acoustics then living. Savart at once recognised the importance of the invention,

rods or axles ; by their means two actions are conveyed on the same shaft.

In 1843, in conjunction with Klosé (see p. 7), he applied ring-keys to the clarinet (Chouquet, *Catalogue of the Museum of the Conservatoire*, p. 73), and the following year to the hautboy (*ib.* p. 67).

and had it brought before the Academy of Sciences. Boehm attended a sitting, read a short paper, giving an account of the new construction, and submitted his instrument to the judgment of the Academy. A Commission was appointed to pronounce a formal opinion on its merits; the Commissioners being Dulong and Savart of the Academy of Sciences, and two musicians, Auber and Paër from the Academy of Fine Arts, who were requested to join them.⁴⁰

By this time a conversion, which ultimately proved a tower of strength to the Boehm cause, had been made in the person of a young genius, destined to rise to the position of an artist of the first rank. This was Dorus, whose magnificent playing established the supremacy of the Boehm flute in France; it being more than sufficient to form a counterpoise to the opposition of Tulou, who had brought the whole weight of his great influence to bear against the new system. The precise year in which Dorus abandoned the old flute, like so many other dates connected with our inquiry, is the subject of conflicting statements; but although it has been said to be earlier by three or four years, it can scarcely have been later than 1837.

Camus and Dorus were not the only artists who had become disciples of Boehm by this year; the new instrument had been taken up by M. Victor

⁴⁰ The following is the entry in the *Comptes rendus* (vol. iv. p. 705): "*Note sur une nouvelle construction de la flûte*; par M. BOEHM. Commissaires, MM. Dulong, Savart. MM. Auber et Paër, de l'Académie des Beaux-Arts, seront priés de s'ajoinde à cette Commission."

Jean Baptiste Coche, who, as I have already mentioned, held the appointment, as coadjutor of Tulou, of Professor in the Conservatoire of Music. Coche was not satisfied with playing on the Boehm flute for its own sake ; he proceeded to make advances to Boehm, and to put himself forward as competitor with Camus for the pecuniary benefits which seemed likely to spring from the adoption of the novel invention by French flute-players.

On the 6th of November of the year to which we are referring, Coche wrote Boehm a letter which he begged him to keep secret. Notwithstanding the provocation Boehm afterwards received, he never disregarded this request, although, had he been vindictively disposed, he might have used the letter to Coche's prejudice, for it contained a proposal on which it was possible to put the construction that it was an offer to traffic in the name of the Institute of France. It was Coche's habit to profess to be actuated by a desire to watch over the rights, and to study the interest of others ; so, after alluding to his inexpressible admiration for Boehm's magnificent and rich instrument, the ardour with which he devoted himself to its study, and the hope he entertained of one day becoming worthy by his execution to share the suffrages to which the beautiful invention was so justly entitled, he went on to say that it was his duty to inform Boehm that a musical instrument maker of the name of Clair Godefroy the elder had made an exact copy of his flute, had placed his name upon

it as if he had been the inventor, and had openly exposed it for sale in Paris. He expressed the opinion that it would be to Boehm's advantage to put a stop to the production of this "counterfeit" by coming to Paris, and taking out a patent, which would secure for him the sole right, not only of manufacturing his flute in France, but also of importing it into that country. He then stated that he had caused the Boehm flute to be heard by Cherubini, Paër, Auber, Berton, and Halévy, five of the six musicians who were members of the Institute, adding, "I believe that I have in my hands the possibility of getting your instrument adopted, and if private arrangements may be agreeable to you, on the supposition that you are intending to establish a depot at Paris, we could come to an understanding on this subject."⁴¹

At this critical moment, when the old and the new systems were hanging poised against each other in the balance, the influence which the adoption of a favourable report on the Boehm flute by the Institute of France might have on the future of the instrument could scarcely have been over-estimated. Not to mention the honour involved, the prestige attaching to the name of the Institute was, and still is immense. Every visitor to Paris who has crossed the Pont des Arts must have noticed an edifice surmounted by a dome standing opposite the Louvre, near the south end of the bridge; it is the Palace of the

⁴¹ A translation of this letter is given at p. 112, and the original at p. 133.

Institute, the building in which the members meet. On the rolls of the great Society, which is composed exclusively of Frenchmen, are inscribed the most illustrious names of which France can boast in science, literature, and art. Although self-elective, it is in reality a state establishment, no election being valid until it has been ratified by the Ministry, whilst its Palace is Government property, and each member is in receipt of a stipend, paid out of the public revenue. It is divided into five Academies, each Academy being subdivided into Sections. The Boehm flute had already been brought before one of the Academies, the Academy of Sciences. A commission had been appointed whose duty it was to examine it, and to draw up a report. The report would be read before the Academy, and, unless opposition was offered, would, in due course, be adopted. Surely, then, Boehm had no need of Coche's assistance. Was it requisite for a foreign inventor to enter into "private arrangements" with a French flute-player in order to ensure for himself fair treatment at the hands of the Institute of France? What answer Boehm returned to Coche's letter we cannot tell. We only know that he informed him of the commission he had given Camus.

On receiving Boehm's reply, Coche, without more ado, determined to place on the French market an instrument bearing his own name, and to divert to it the coveted distinction the Institute had in its power to bestow. His object he afterwards candidly avowed in a letter to Boehm,

declaring with cynical frankness that as Boehm had empowered Camus to make the most of (*faire valoir*) his invention, and had thus in a manner retired behind that artist, there was nothing left for him but to produce the report of the Institute, and to play on the flute enriched with *his* improvements in order that the public might judge between him and Camus. To carry out his design he allied himself with the flute-maker Buffet.

Coche began by endeavouring to give effect to an idea which Boehm had previously attempted to realise, and which others have since sought to reduce to a practical form; he "imagined," he tells us, "in conjunction with M. Buffet, a sort of mixed instrument" on which the new system of construction was to be combined with the old fingering. The result not being satisfactory, he was obliged, as he confessed, to return to Boehm's invention, adopting its mechanism, and "adding to it" certain "modifications."⁴²

The first of these modifications was the substitution of a closed for Boehm's open G sharp key. The key introduced by Coche was not constructed with a double action like the well-known Dorus

⁴² "Dans le but de faire adopter plus vite la flûte nouvelle par ceux qui jouent l'autre, j'imaginai (de concert avec M. Buffet jeune) une sorte d'instrument mixte, ou l'ancien doigté pût être conservé sans employer la complication du mécanisme de Böhme; je ne pus obtenir un bon résultat. Je trouvai bien quelque chose de la qualité de son et de la justesse qui distingue la flûte de Böhme, mais pour exécuter les notes élevées, il fallait bien déroger aux anciennes règles, aussi je fus obligé de revenir à la flûte nouvelle, en adoptant le mécanisme et en y ajoutant les modifications qui m'ont paru utiles."—Coche's *Examen Critique*, p. 12.

G sharp key, nor was it supplemented with a duplicate hole, as on the Radcliff flute; it was a restoration pure and simple of the G sharp key of the old flute,⁴³ and, as such, it constituted a

⁴³ Boehm, in arguing against the application to his flute of a closed G sharp key, states that his fingering is based "on the opening and closing of the holes in regular succession." But Coche observes that Boehm, who had retained the closed E flat key, was not in a position to object with propriety to the closed G sharp key. "If, as a rational piece of work," he remarks in his *Examen Critique*, "Boehm wished that the fingers should be raised so as to make an ascending progression, in order to be consistent, he should have placed the E flat key open."

In giving his reasons for returning to the closed G sharp key, Coche, after drawing attention to the circumstance that the easiest keys on the old become the most difficult on the new flute, and *vice versa*, proceeds thus: "I recollected that in playing the violoncello I had already noticed that the little finger of the left hand and the ring finger were, after their removal from the position of the hand, weak in the extreme. My remark is so applicable to the flute that I resolved to restore the closed G sharp key, just as it is on the ordinary flute, and to make a connexion with the G sharp key to utilise the right hand, which is raised in the shakes and turns made with the ring finger and the little finger." He then points out how much work can be transferred by using a closed key from the little finger of the left hand to the spring which closes the key.

But the chief objection to the use of Boehm's open key for G sharp does not lie, as Coche supposed, in a want of strength in the little finger of the left hand (indeed, unless the spring is made needlessly strong, a child finds no difficulty in closing the key), it depends not on the little finger itself, but on the way other fingers are affected by the action of the little finger. From causes into which this is not the place to enter, the difficulty of raising the third, and in a less degree the second finger is much greater when the little finger is kept down, than when it is left free, so that if the flute-player attempts to lift either of these two fingers whilst he is pressing the little finger on a key, he finds them stiff, or hampered in their movement. "The great cause of difficulty," remarks Mr. Richard Carte in his *Sketch of the Successive Improvements in the Flute*, "in fingering the Boehm flute arises from the necessity of constantly keeping the little finger and thumb of the left hand upon their keys to shut them, which otherwise are kept open by their springs. This, especially in the upper octave, cramps the action of the other fingers. The cause of the superior facility of the ordinary flute is

flagrant departure from the open-keyed system, its effect being to veil the A, the note above the now closed G sharp hole. This Coche did not deny, but he stated that he had taken "the precautions necessary to enable the A to preserve the accuracy of intonation and equality of tone of all the other notes."⁴⁴ The precautions which have since been taken by others for this purpose, consist in enlarging and lowering the A hole, this being a violation of the second of the two principles (the equalisation of the size of the holes) on which the Boehm flute is founded.

That the reintroduction of a closed G sharp key, even in the improved form suggested by Dorus, which was so contrived that both of the

the freedom of these fingers, the keys worked by them being kept closed or shut by their springs." Coche, as we have just seen, met this difficulty, as far as the little finger was concerned, by reinstating the closed key of the old flute. Mr. Carte applied another remedy. He connected the open G sharp key with the F sharp key in such a way that when the first finger of the right hand was pressed down to make F sharp it carried with it the G sharp key. By this expedient not only is the left little finger set free whenever the first finger of the right hand is pressed on the F sharp key, but many other advantages are gained. Amongst them is the comparatively small number of times the left little finger is required to move in ascending the twelve major scales and the twelve major common chords, the relative numbers being, according to Mr. Carte, as follows: on the Boehm flute 71 times, on the ordinary flute 51, but on Carte's flute 22 only. Moreover, on this flute the facility of fingering in some of those keys in which there is no G sharp in the scale, such as A major and E major, is quite astonishing; A major becoming what was called on the old flute the Lord Mayor's key, whilst in E major execution is, if possible, even easier.

⁴⁴ "Les précautions nécessaires pour que le *la* pût conserver la *justesse* et *l'égalité* de son de toutes les autres notes."—Coche's *Examen critique de la Flûte ordinaire comparée à la Flûte de Böhm*, p. 14.

Boehm principles were strictly adhered to,⁴⁵ was “a retrograde step” is asserted by a gentleman who certainly cannot be said to be swayed by

⁴⁵ The Dorus key was brought out in 1838, and was, it seems, at once adopted by Coche. In reproducing in his *Method*, published in 1839, the passage in his *Examen Critique* in which he states that he had restored the G sharp key “as it exists on the ordinary flute” he alludes to the Dorus key, but without mentioning Dorus’s name, by introducing in a parenthesis, “however, G sharp keys are also constructed open and closed by one finger only.”

Camus, like the majority of his countrymen, became a convert to the Dorus key. In the English edition of his *Method for the Boehm Flute*, published in London in 1849, when he had taken up his residence there for the purpose of teaching the instrument, he wrote, “I was the first who played and taught the Boehm flute in France. I played it for one year just as I received it from the hands of the Inventor in 1837. But a year afterwards, having become acquainted with the G sharp key invented by Mr. Dorus, and having convinced myself that this key, though an extraordinary simplification, *was still in no way an alteration* of Boehm’s system, I adopted it without hesitation.” He expresses himself on the subject thus: “The invention (of Mr. Theobald Boehm) has been appreciated in England, with respect to the correctness of *intonation and equality of tone*; but reasonable alarms have been expressed and entertained at the difficulties consequent upon too great an alteration of the fingering. Hence the multiplicity of inventions, or rather incomplete imitations of the Boehm flute, which would not have been attempted, if in England (as in France) the G sharp key so ingeniously invented by Mr. Dorus had been immediately adopted. That key so simplifies the fingering that *in a very short time* a person accustomed to the old system would be able to play on the Boehm flute. It would be erroneous to suppose that this key is of advantage to those only who already play upon the old flute; and that for instance a beginner ought to take up the instrument in the state in which Boehm conceived it. I say that it would be erroneous, for in his system the left hand, already entrusted with the support of the flute, employs four fingers to stop four holes, so that the little finger is constantly at work, whilst with the *Dorus key* the little finger is almost always free, and the left hand has the same advantage as the right, which with the three fingers opens and stops four holes.” “A no less convincing proof of the efficacy of the *Dorus key* is the fact that it renders useless the crutch imagined by Boehm for the support of the flute.” “This key has been in England *improperly* called a ‘shut key,’ for it is

prejudice against Coche, for he confesses that he regards him "with feelings akin to reverence." Moreover this same gentleman, Mr. R. S. Rockstro, declares that Boehm, whom he is said to look upon as an ignorant impostor, "deserved much credit for his courageous and persistent efforts to bring the little finger of the left hand into activity," by means of an openstanding key, "in spite of the obstinate resistance of many professors and amateurs whose fingers had become partly incapacitated by having been habituated to a vicious system."⁴⁶

Another of Coche's modifications was to confer on the third finger of the left hand the power of closing the B natural hole by placing a ring round the A hole, and connecting it with the B flat key, so as to obviate the difficulty of making B flat in rapid passages when that note was preceded or followed by G. But Mr. Rockstro informs us that this modification would have had the effect of "spoiling" the high F sharp, the vent hole of

an *open key*, and makes no change in Boehm's system; the only difference is in a double-action spring, which enables the player to finger the G sharp as on the old flute."

There being objections to the use of two springs for one key, flutes with the closed G key are now usually constructed with a duplicate G sharp hole instead of the Dorus key; an arrangement with which those who play on the Radcliff model are familiar. The plan, however, of employing two springs, one stronger than the other, was retained in Ward's flute. Clinton, too, in his Equisonant flute employed an open C natural key which was kept closed by the more powerful spring of the B flat key. The same principle was adopted by the late M. Barret, the well-known hautboy player, for a highly ingenious and very novel flute which he designed; an instrument which did not come before the public.

⁴⁶ Rockstro's *Treatise on the Flute*, section 378, p. 192.

which it would close; he therefore gives it as his opinion that "it is hardly likely to have been actually applied to a flute," he being "inclined to think that this modification only existed on paper."⁴⁷ However, it is right to say that amongst Coche's modifications was one of real value; he claims to have "imagined" the shake key for D sharp with which flute-players are now familiar, but it should be added that this key appears in the specification of Buffet's patent.

If Boehm was under the impression that in order to bring about the adoption of his invention by the Institute it was not necessary for him to lay on a pipe to supply Coche's cistern from the Pactolus which that gentleman believed could be made to flow from the new flute, it was not long before he was undeceived. The Commission was appointed in May, but month after month passed away, and 1837 came to an end, yet no action had been taken. The first to move in the matter was Camus. He addressed a communication to the Academy of Sciences calling attention to the circumstance that the flute on which the judgment of the Academy was to be pronounced had been left with him by the inventor to be placed at the disposal of the Commissioners, when they should find it convenient to examine it. Camus's letter came before the Academy at a sitting held on the 8th of January, 1838, and the Com-

⁴⁷ Rockstro's *Treatise on the Flute*, section 632, p. 356. This modification is shown in the drawing of Coche's flute in his *Examen Critique*, reproduced on p. 148.

mission was thereupon requested to hasten on the report.⁴⁸ However, no further allusion to the report is to be found in the *Comptes rendus* of the sittings of the Academy of Sciences. The explanation seems to be that the affair now entered on a new phase; that the hand of a superior power made itself felt, and that a change was brought about both in the venue of the trial, and in the judges by whom the inquiry was to be conducted. The Commission, it will be remembered, was composed of two members of the Academy of Sciences, MM. Dulong and Savart, and two musicians, Paër and Auber, who were invited to join them, from the Academy of Fine Arts. The two scientists Dulong and Savart disappear from the Commission, whilst four musicians, Cherubini, Halévy, Carafa, and Berton, are added to the two, Paër and Auber, who had previously been nominated; the Commission, as reconstituted, consisting of the six musicians who formed the Section of Music of the Academy of Fine Arts, to which, on a request being made to it by the Minister of the Interior, the new flute was referred. How the Ministerial influence had been evoked, there is, as far as I am aware, no record in existence to show.

⁴⁸ "M. Boehm avait soumis l'an passé, au jugement de l'Académie, une *flûte* d'une construction particulière, et qui fut renvoyée à l'examen d'une Commission. Aujourd'hui M. CAMUS écrit que cette flûte lui a été laissée par l'auteur pour être mise à la disposition des Commissaires, lorsqu'ils jugeraient convenable de l'examiner.

"La Commission sera invité à hâter son Rapport."—*Comptes rendu des Séances de l'Académie des Sciences*, vol. vi. p. 52.

To further the object he had in view, Coche had recourse to his pen. He prepared a pamphlet, in which he came to the assistance of the examiners, and saved them the trouble of making an examination by doing the work himself. The pamphlet was not published at first, but was presented privately to the six members of the Section of Music who were to act as judges. It was entitled, 'A Critical Examination of the Ordinary Flute, compared with the Flute of Boehm.' Coche, however, did not confine himself to this examination. He stated that after studying the new instrument for about six months, he had seen the necessity of introducing into the system certain modifications, and he proceeded to describe, and to set forth the advantages of the three modifications just mentioned: namely, the reintroduction of the closed G sharp key, this being a modification in which both of the principles of the Boehm flute were set at defiance; secondly, the ring placed round the A hole and connected with the B flat key, the effect of which would have been so disastrous that Mr. Rockstro considers it unlikely that this modification was ever actually applied to a flute; and thirdly, the new shake key. Nor were these the only modifications made known to the judges in the pamphlet. So complete a modification had Coche's opinion on the subject of a "counterfeit" of the Boehm flute undergone on the receipt of Boehm's letter in reply to his invitation to enter into "private arrangements," that he wrote as follows:—"The instant this instrument was

called by its usefulness and the choice of connoisseurs to replace the old flute, a distinguished maker, Mr. Buffet the younger, hastened to study the details of the mechanism, and he has succeeded in manufacturing with an exactness truly scrupulous flutes similar to those of Boehm. For the future it would be strange that one tied himself down to get fetched from Germany an instrument which is going very soon to become popular in France."⁴⁹

Whilst Coche was thus engaged Camus, on his side, was not idle. It appears from a letter which,⁵⁰ though it is unsigned, there can be but little doubt was written by him, that he was taking active steps to defeat the schemes of his rival. His efforts, however, as will be seen, proved unavailing. Coche's pamphlet bore fruit. Berton, one of the judges to whom it had been sent, drew up a report on behalf of himself and his judicial brethren. That the pamphlet was the cause of the report is asserted by Coche himself.

The Academy of Fine Arts sits every Saturday afternoon. From a statement made by Coche in a letter to Boehm it would seem that the case should have come before it early in January, but that delay was again interposed, it being put off from sitting to sitting for a period of nearly three months. At length, on the 24th of March, the report was brought up. It now appeared that the subject which the Academy had been requested by the Minister of the

⁴⁹ *Examen Critique*, p. 18.

⁵⁰ The letter will be found at p. 114.

Interior to refer to the Section of Music was not the important advance made by Boehm in the construction of flutes and other finger-holed instruments, but, if the report can be trusted, "the improvements introduced into the manufacture of the flutes called 'flutes on the Boehm system' by M. COCHE," and the "method," or "school" as we should call it, that gentleman had written for facilitating the study of the new instrument. Instead of the flute left by Boehm with Camus, there was presented to the Academy of Fine Arts by the Commissioners one made by Buffet, at the construction of which Professor Coche was said to have "presided," and to which he had caused to be added "new ameliorations of his own invention."

Although the Commissioners were deputed to examine the improvements introduced by Coche into the manufacture of the Boehm flute, there is not a word from the beginning to the end of the report to indicate that they understood in what these improvements consisted. As to how they conducted the examination we have no information; but they had qualified themselves, as we learn from the report, for the task entrusted to them, not by conferring with Savart, but by "chatting" with another member of the Academy of Sciences who was an amateur flute-player. But either this distinguished gentleman did not prove a very competent instructor, or else his pupils were not sufficiently versed in the philosophy of the flute to be able to comprehend his explanations, for Mr. Rockstro, referring to an

observation imputed to him in the report, writes: "It will be seen, from this remark, that the illustrious Charles did not quite understand the subject on which he was conversing, or else that his words were imperfectly reported."⁵¹ We know that Coche played at the Institute, but whether he played to the examiners when they were occupied with the examination, or at the sitting of the Academy of Fine Arts when the report was read and the flute presented, there is nothing to show. We may be sure, however, that there could have been no Parisian Mr. Rockstro present at the trial to raise a warning voice, and to point out to the judges that, of Coche's three "ameliorations," one was a contrivance which, if applied to a flute, would ruin a note in the high octave, whilst another involved a retrograde step, "ill advised and unphilosophical in the highest degree";⁵² for one would suppose, on reading the report, that Coche was entitled to almost as much credit as Boehm himself. "But that which ought, it seems to us"—I am translating a quotation from it—"to more particularly deserve our encouragement and our eulogies, is the constancy, the tenacity displayed by M. Coche, in causing this happy invention to bear fruit. He carried off the first prize for the flute at the Conservatoire; his brilliant talent has caused him to be nominated there a professor for the flute class. Well then! perceiving the importance of the discovery, he has had the courage to give himself

⁵¹ See note, p. 121.

⁵² Rockstro *On the Flute*, section 378, p. 192.

up to the study of the new instrument, and to superintend its manufacture, causing notorious improvements to be made therein.”⁵³

The report, to which each of the six members of the Section of Music, Cherubini, Paër, Auber, Halévy, Carafa, and Berton had affixed his signature, was read before the Academy of Fine Arts, and its conclusions adopted. The sitting before which it came was held, as I have said, on the 24th of March. “In the month of April following,” writes Coche, “several drawings and tables of fingering were given to me to make me acquainted with Mr. Gordon as the *first inventor*.”

Calumny, whose voice when she is new-born is but a whisper, if she be not smothered in the cradle, will gather strength by degrees until she can shriek from the housetop. It is from an acorn, which a child can crush beneath his heel,

⁵³ These remarks were but the echo of certain high-flown reflections in which Coche had indulged in his pamphlet. He had intimated that he was actuated by a high sense of duty in studying and making known the Boehm flute, and had moralised on the hard fate of inventors and pioneers, amongst whom he included himself, in working for the benefit of others. “But it must be admitted,” he exclaims, “it is a truth sad enough which is applicable to the labours of all those who invent: it is by no means to them that their invention is of benefit. And when the new flute shall be diffused, estimated at its true value, we other artists who shall have studied it, extolled it, and caused it to be appreciated, we shall be far from immediately reaping the fruit of the pains we have taken. The footsteps we shall have traced will be followed by others who will no longer meet with obstacles.

“But when a man believes that any invention whatever can be of general utility, he must divulge it, he must noise it abroad, it is a duty, even when the labours of the artist are not crowned with success.”—*Examen critique de la Flûte ordinaire comparée à la Flûte de Bôhm*, p. 19.

that there springs the mighty oak a giant is powerless to uproot. The seed thus planted by an unknown hand brought forth a sapling, which, watered by jealousy, and watched by hatred of change, quickly spread its noisome arms and lifted high its poisoned head. This upas-growth, which should have been cut down and cast into the fire when those to whose failings it owed its life had passed away, has now, under the fostering influence of Mr. Rockstro's imagination, yielded fruit in tenfold abundance.

Coche, having received the drawings and tablatures, and having heard the assertion with which they were coupled, conceived the idea of bringing forward Gordon as the inventor, and of thrusting Boehm into the background as a mere modifier, whilst he himself posed before his fellow-countrymen as the perfecter of the new instrument; a design in carrying out which he certainly displayed diplomatic skill of no common order.

His first step was to write to Gordon, who was known to be living in retirement at Lausanne, in Switzerland. What he said to him we have no means of knowing; for, in publishing what he is pleased to term the correspondence on the subject, he withheld his own letters. We can judge, however, of the tenor of his representations from the effect they produced on Gordon's wife, into whose hands his epistle came, owing to her husband having become deranged. On reading it, Madame Gordon came to the conclusion that Boehm (whose flute, it is needless to repeat, had been invented more than five years before) having

heard during the winter then just over of her husband's mental affliction, had taken advantage of his helpless condition to appropriate his invention and bring it out as his own, excusing himself on the ground that, by so doing, he was preventing its benefits from being lost to the world. She confessed that she was unable to throw light on a question respecting which Coche appears to have desired information—namely, whether the flute which Boehm had sent him was her husband's, or else an instrument for the idea of which Boehm was indebted to her husband, or, possibly, one perfected in imitation of that of her husband. In her perplexity she proposed, if Coche should approve of the step, to write to Boehm's workman with whom her husband had made his flute, in order to ascertain which of these surmises was correct. Nor can it scarcely be open to doubt that Coche, as was his wont, had not omitted to allude to the purity and loftiness of his motives, to his disinterestedness, to his sense of duty, and to his zeal in defending the right; for Madame Gordon believed that she could discern in his actions the agency of a higher power, and conceived for him a feeling not unlike that with which, in after years, he inspired Mr. R. S. Rockstro—a feeling akin to reverence. To her it seemed that the stranger who had thus come forward, uninvited, as the protector of her stricken and prostrate husband, at the prompting of "a delicate sentiment," which impelled him "to desire to be able to render justice to him to whom it belongs," must be the

chosen instrument of an unseen but ever-watchful Providence. The poor lady little thought, when assuring him, as she did, of the claims he would have on her gratitude and her most profound respect, if he would honour her with his advice as to what proceedings she could take to restrain the unscrupulous appropriator of a sick man's rights, that she was appealing to the very person who, according to his own showing, was endeavouring to reap for himself the fruits of her husband's ingenuity.

The letter⁵⁴ in which Madame Gordon gave expression to these ideas suited Coche's purpose admirably. He had no sooner received it than he turned his attention to Boehm, with whom he was not less successful. In writing to him he was bound, in common fairness, in order to give him an opportunity for an explanation, to acquaint him, if not with the communication which had passed between him and Madame Gordon, at least with the drawings and tablatures which he informs us had been placed in his hands to make him understand that Gordon was the inventor of the Boehm flute. Instead of so doing, however, the course he adopted was to tell him that he was openly accused in Paris of palming off Gordon's flute as his own, but to conceal from him the evidence on which the allegation was based. Nor was this all. Although he was secretly engaged in collecting statements to make it appear that the Boehm flute was a piracy, he assured Boehm that he exclaimed against such

⁵⁴ This letter will be found at p. 127.

an assertion—nay, he even took credit to himself for the frankness with which he was treating him. But he could not resist the temptation of adding, “Any one else would, perhaps, trouble himself very little about this dispute on the subject of the invention, and would seek to substitute himself for one or the other inventor, or for both of them together,”⁵⁵ thus disclosing with unconscious candour what was passing in his mind.

In answering the letter, Boehm betrayed a want of accuracy which, considering that his honour was at stake, is much to be regretted. Early in the year 1833 Gordon had written⁵⁶ to Boehm asking him to make a flute for him. Boehm had consented, and at the same time had suggested that Gordon should come to Munich and superintend its construction in person: and this Gordon accordingly did. But when referring to these occurrences in his reply to Coche, Boehm represented them to have taken place in 1834, instead of 1833. He thus gave Coche an opportunity of attacking his character as a man of veracity, of which he was not slow to avail himself.

He was able to produce a letter,⁵⁷ written by Gordon in July 1833, which showed that not only was he at Munich at that time, but that his flute was already finished and an announcement of it printed and ready for distribution. Discredit having thus been thrown upon one of Boehm's statements, all the rest were naturally received with incredulity, and those of Madame Gordon,

⁵⁵ A translation of Coche's letter is given at p. 115.

⁵⁶ See *infra*, p. 95.

⁵⁷ See *infra*, p. 132.

whose letter Coche printed in juxtaposition with that of Boehm, found general acceptance.

In commenting on the letters,⁵⁸ Coche assumed an air of lofty indifference, declaring that he was influenced by conscientious motives only, and by a love of truth and justice, as it was really a matter of little importance by whom the instrument had been invented; and, whilst professing to allow the reader to draw his own conclusions from them, he adroitly prejudged the case by bringing forward his own interpretations of controverted points, and speaking of them as if they were self-evident truths.

He further followed up the advantage he had gained by issuing misleading engravings;⁵⁹ and, although he professed to consider that it made little difference who was the inventor, he seemed determined that his own views on the subject should be impressed on the student at the very outset of his career, for he published his instruction book under the title of a 'School for the New Flute, Invented by Gordon, Modified by Boehm, and Perfected by Coche and Buffet'; indeed, so unscrupulous was he in his attempts to excite prejudice against Boehm, that he did not

⁵⁸ See *infra*, p. 124. The letters as well as the report of the Commission and the attack on Boehm were appended to the pamphlet which Coche had presented to the Commissioners, and which he afterwards published with these additions to the world. Its full title is: *Examen critique de la Flûte ordinaire comparée à la Flûte de Bôhm, présenté à MM. les Membres de l'Institut (Académie Royale des Beaux-Arts, section de la Musique)*, par V. Coche, Professeur au Conservatoire. Paris, Chez l'Auteur, Rue du Faubourg-Poissonnière, No. 30. 1838.

⁵⁹ See p. 273, also p. 148.

hesitate to state on the title-page of this book, that the fingering of these three instruments, viz. those of Gordon, Boehm, and Coche, was identical, though, as a matter of fact, no less than five of the notes of the Boehm flute were fingered differently from those corresponding to them on Gordon's instrument.

AN EXEMPLIFICATION OF
THE PROGRESSIVE DEVELOPMENT
OF
OPEN-KEYED MECHANISM FOR
THE FLUTE.

THE FIVE-FOOT FLUTE.

Exact date unknown.

THE plan of employing open keys to act upon two or more of the six holes of the flute, when placed so far from the others as not to be within reach of the fingers, was first carried out on bass flutes. So far from being an idea of recent origin, it seems to have even preceded the invention of the additional keys for the semitones, for M. Chouquet was of opinion that the flute here represented dates from the end of the seventeenth or the beginning of the eighteenth century.

The instrument from which the drawing is taken was presented to the Museum of the Conservatoire of Paris by M. Dorus. On account of its great length, it is familiarly known as *a five-foot flute*. It measures exactly four feet (English) from end to end, and it requires long arms on the part of the performer. It is made of box,

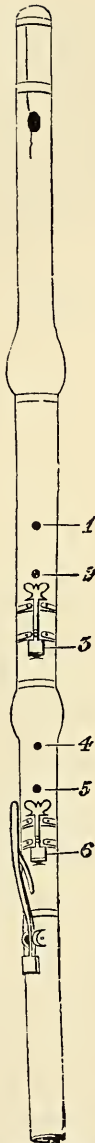


Fig. 3.—The Five-foot Flute.

and the keys are of brass. The maker's name, *J. Beuker, Amsterdam*, surmounted by a crown, is branded upon it. The head is cracked, but it has been carefully repaired and clamped with a brass ferrule. It sounds easily, and the tone is full and rich. It is an octave below the concert flute.

The distance between the C sharp and B holes (1 and 2) is two inches and an eighth, and that between the G and F sharp holes (4 and 5) one inch and seven-eighths; an uncomfortable, but possible stretch, in each case, for an ordinary hand. But the space between the B and A holes (2 and 3) is no less than three inches and an eighth, and that between the F sharp and E holes (5 and 6) two inches and seven-eighths. As the A and the E holes (3 and 6) were thus placed quite out of the reach of the longest fingers, it became necessary to have recourse to mechanical means for closing them. The keys employed for this purpose are double levers of the kind commonly found on hautboys of this early period. They terminate, as was usual at the time, in two cusps, for the accommodation of left as well as right-handed players.

The bore is conical, but funnel-

shaped at its lower end, as the following measurements of its diameter will show :—

	in.
At its upper end above the cork	$1\frac{1}{8}$
At the junction of the first joint with the head	$1\frac{1}{4}$
At the junction of the second joint with the first	1
At the junction of the foot with the second joint	$0\frac{7}{8}$
At its lower end	1

MACGREGOR'S BASS FLUTE.

1810.

Another step in advance is here made. Two more of the six holes, viz. those for C sharp (1) and G (4), are covered with open keys. Both of the keys now added still survived in an altered form on Carte's, and one of them (that for the C sharp hole) on the Boehm flute (Fig. 11, *c*).

In order to shorten the instrument the bore is doubled in the head. This gives it a singular appearance.¹

The patentee, Mr. Malcolm Macgregor; musical instrument maker, of Bell Yard, Carey Street, London, thus describes his invention :—

“Figure 1st represents the form of my new-invented flute of the largest size ; it is composed

¹ It must not be supposed that these ideas of Mr. Macgregor were new. In Diderot and D'Alembert's *Encyclopædia*, Paris, 1751-80, is an engraving of a bass flute, the bore of which is similarly bent back upon itself in the head, and the same four holes covered with keys, the difference being that single instead of double levers are employed.

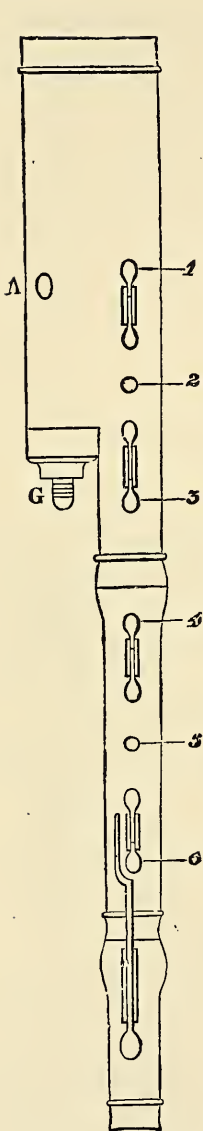


Fig. 4.—MacGregor's
Bass Flute.

of three joints, but may be made of a greater or less number, as may be judged most convenient ; the top joint G, which I call the head, is of an oval or flat form for the accommodation of two calibers or bores, which bores answer similar purposes to the two joints called the head and middle of a German flute having the four usual joints, one of such bores having the mouth hole, the other of such bores having three holes for the left or upper hand. The mouth hole A is placed on the side of the head or top joint G, at a convenient distance from the three holes for the left or upper hand, so as to allow the mouth and left hand to be at a suitable distance from each other, and which they will be by the proportion in Figure 1 being observed, or nearly so, and so as to allow the body to be in an easy posture. The tone or sound is produced by the wind proceeding from the mouth hole up to the caliber or bore, in which it is made, through the other bore, by means of the communication between the two bores. By thus having the two

bores in one joint, the larger sized new-invented flute is much curtailed in length and rendered manageable to perform upon, which would not be the case if such bores were made into two joints. 1, 2, 3, in the same Figure 1, represent the three holes to be played with the left or upper hand; two of such holes, 1 and 3, being acted upon by keys, which are to be so made as to remain open till used; these keys are necessary, owing to the distance which the holes are from each other, being in a new-invented flute of the largest size, about double to that of a concert German flute. The holes 1 and 3 are supposed to be hid in the Drawing by the flaps of the two keys. 4, 5, 6, in the same Figure 1, represent the three holes to be played with the right or lower hand; two of such holes, 4 and 6, being acted upon by keys in the same manner as described as to 1, 2, 3, and the holes 4 and 6 are supposed to be hid in the Drawing similarly to the holes 1 and 3, as before described. The holes 1, 2, 3, and 4, 5, 6, respectively of a new-invented flute of the largest size are about the distance of three inches and one-fourth from each other. The mode of fingering this flute is similar to that of the concert German flute, except that the keys acting on the holes 1 and 3, and 4 and 6, are to be used instead of the fingers being placed on those holes; the tails of which keys are to be so made as with the open holes to form about the same distances from each other as the finger holes of a concert German flute. The Drawing represents a new-invented flute to produce a bass or an octave

below to the German concert flute, having only one key for the D sharp ; but if the new-invented flute be required as a bass to a German flute, having keys for more semitones, or descending to C natural below the lines, then corresponding keys must be added on the new-invented flute accordingly. The lengths of the different joints of the largest size of the new-invented flute as described in the Drawing, Figure 1, are as follows :—The head or top, fourteen inches ; the second joint, about ten inches ; third joint or foot, about seven inches. I have given these and the other different dimensions as near as may be ; which, however, the manufacturer will regulate at his discretion, so as to produce the different notes in proper tune. As a general rule it may be observed, that the distances in the largest size new-invented flute between the holes corresponding to the finger-holes to a concert German flute, and between the nearest of such holes to the mouth hole, and the mouth hole, are about double those of the concert German flute.”

MacGregor also proposed to bring the holes within reach of the fingers by boring them obliquely, and so causing them to approach each other in the substance of the wood. This expedient had long before been resorted to in the construction of bass flutes-à-bec and bassoons.

NOLAN'S RING-KEY.

1808.

The keys of the flutes just described were only intended to close holes which the unaided finger could not reach. We now come to a new departure, the introduction of mechanism by means of which a finger, when pressed down to close a hole, carries with it a lever acting on a valve which closes a second hole; thus conferring on the finger the power of doing what it had previously taken two fingers to accomplish.

In the year 1808, a clergyman, the Reverend Frederick Nolan, of Stratford, near Colchester, took out a patent for "certain improvements in the construction of flutes, flageolets, hautboys, and other wind instruments." These improvements consisted, he states, "in constructing wind instruments, which are modulated by the fingers, on the principle of bringing the semitones, which are generally cross-fingered or played by additional keys, under the modulation of the fingers which play the regular diatonick notes."

Amongst other curious contrivances, which it would be out of place to describe here, was a ring-key. It consisted of a ring surrounding a hole, and an open-standing valve; the two being connected by a lever, which might be either single or double. The ring was made by boring a hole in the touch of a key; a circumstance which has an important bearing on the history of the invention of ring-keys.

In the engraving, which is taken from the specification of the patent, this ring-key, *g*, is shown as applied to a flute for the production of G sharp. The reader will perceive that on raising the first finger of the right hand a player would pass from F sharp to G sharp (a fingering in use at the present day on Carte's flute), and herein he may discern the germ of the open-keyed system of fingering. But as there appears to be

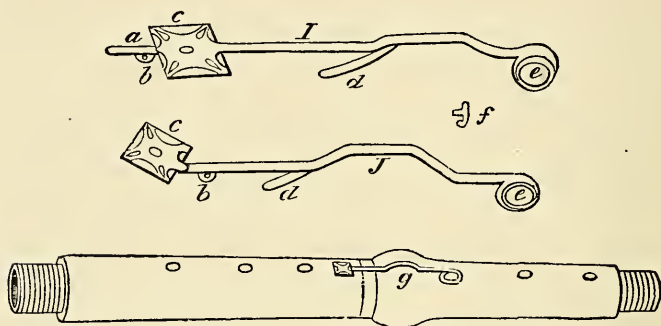


Fig. 5.—Nolan's Ring-key.

no provision for G natural, he will no doubt wonder how this note was made.

It should be mentioned, therefore, that the valve was only to be left free to act when music was being played in those keys in which there is no G natural. Should G natural, however, occur as an accidental, the performer was directed to place the finger, instead of on the ring, on the lever just above it, and so to close the G sharp hole whilst leaving the G natural hole open. Before commencing to play in a key in which G natural formed one of the notes of the scale, the

player fastened down the valve by means of a catch provided for the purpose. Whilst playing, should he meet with an accidental G sharp, he had to touch the catch and so release the valve. This, as well as the construction of the ring-key, is explained by Mr. Nolan, in the specification of his patent, as follows:—

“In order to bring the acute semitone under the modulation of the finger which plays the regular diatonick note, let a perforated key (I) be placed over a hole bored to produce the required semitone between the proper hole and the hole next above it, of the following construction:— Let it be made of a proper length to cover both holes, viz. that sounding the full tone with its touch (*e*), and that sounding the semitone with its valve (*ε*); let it be so bored through the touch (*e*) as to permit the full tone to pass freely through the perforation (*e*), or to be completely stopped by the finger which presses the key down; let it have its hinge (*b*) behind the valve (*c*), its spring (*d*) between the perforation and the valve, and let it be furnished with a protecting tongue (*a*) behind the hinge, to prevent the spring from throwing the touch too high. For the purposes of modulation there should be likewise a catch (*f*) placed behind the touch, which, by turning on a pin or pivot, may fasten down the key when it is fixed to the instrument (*g*) in a box or ball properly placed for the hinge. In place of this key a jointed key (J) of the same kind as those used on the German flute and hautbois may be used when there is sufficient distance between

the holes sounding the full tone and semitone to admit of a double lever's being employed. This key should be perforated, as well as the former, and occasionally fastened down by means of a catch. Hence, on loosing the catch, the acute semitone may be produced by the same fingering as the full tone. The accidental of the former is produced by pressing the key towards the valve, and permitting the sound to come through the perforation; the accidental to the latter is produced by touching back the catch, and allowing the key to spring up. This contrivance is principally of use in producing $g\sharp$ on the flute and such instruments, and $f\sharp$ on the bassoon and clarinet, &c.; middle $c\sharp$ on the clarinet may be produced more simply than at present by placing the touch of the key which produces that note under the modulation of the fourth finger of the right hand, so as to enable the performer to cover the proper hole of that finger while he presses the key, or the former being stopped or plugged up to modulate the latter."

As the advent of the Boehm flute drew near, attempts to devise open-keyed mechanism began to multiply. Thus, in the 'Allgemeine Musikalische Zeitung' for 1824, there is to be found, as Mr. Rockstro has pointed out, the drawing and description of an openstanding key by means of which one and the same aperture in the flute

could be made to do duty either as a large or a small hole. The first finger-hole, that for C sharp closed by the first finger of the left hand, was surmounted by a valve in which there was a perforation; the perforation being smaller than the hole itself. The valve was acted on by a crescent which partly surrounded the B natural hole, so that when the second finger of the left hand was pressed on this hole the aperture in the flute covered by the valve would be closed, whilst the perforation in the valve would be left open. This contrivance was the proposal of a German amateur, Dr. Pottgiesser. A somewhat similar



Fig. 6.—Pottgiesser's Key.

device for the same purpose was many years afterwards applied by Mr. Richard Carte to the same hole (that for C sharp) on his cylinder flute with the old fingering.

In 1826, two years after the publication of the account of Pottgiesser's key, Buffet, as already mentioned (p. 44), saw a ring-key on a clarinet in Paris, but neither drawing nor description of it is known to exist.

In the year following (1827), Gordon commenced his experiments, but no drawings of the flutes he made prior to his connection with Boehm have been preserved. The next year (1828) another open key made its appearance,

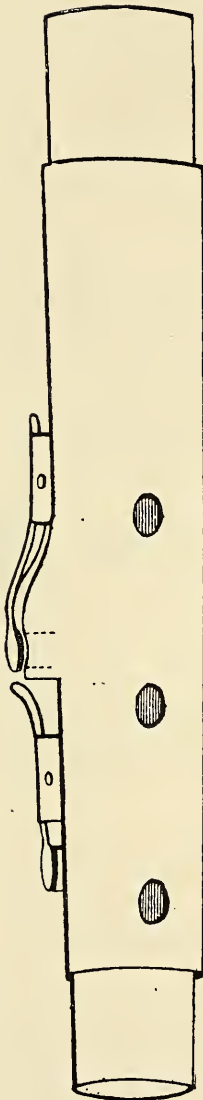


Fig. 7.—Gottfried
Weber's
C natural Key.

that for C natural played with the left thumb, with which we are all so familiar. It was described and figured by Gottfried Weber in an article in the German musical periodical, 'Cæcilia.' But there was no novelty here. From time immemorial a hole closed by the left thumb had been in use on the *flûte douce*, and in 1800 a proposal to close the C natural hole with the left thumb, either with or without an open key, had been made by Tromlitz.

Again, in 1831, Boehm, as we have just seen, observed a ring-key of ~~the~~ the same sort on Gordon's flute. But we are left in the dark as to the details of its construction, for Gordon subsequently discarded it to adopt another ring-key, the idea of which was communicated to him by Boehm. Indeed, when we consider how much attention the improvement of the flute had attracted about this time, it seems not unreasonable to suppose that many such expedients, of which we have no record, were suggested.

BOEHM'S FIRST MODEL, KNOWN AS GEROCK AND
WOLF'S FLUTE.

1831.

This is the flute which Boehm made during his visit to London in 1831.² A passage in one of his letters to Clinton, in which he calls it his first model, enables us to identify it as the instrument, which, as he states in his letter to Coche,³ he showed Gordon when he first became acquainted with him.

The engraving is a facsimile, reduced in size by photography, of a drawing in the prospectus issued by Messrs. Gerock and Wolf. It appeared in the shape of a small pamphlet, entitled 'Scale and Description of Boehm's Newly-invented Patent Flute, manufactured and sold by the Patentees only, Gerock and Wolf, 79 Cornhill.'⁴

The following is an extract from it:—

"The patentees, Messrs. Gerock and Wolf, having availed themselves of the valuable assistance of Mr. Boehm, principal flutist to the King of Bavaria, distinguished not only as a musician but for uncommon powers of mechanical invention, have succeeded in perfecting a flute devoid

² "The first model I made at my friend Mr. Wolf's in 1831, proves that I wanted to preserve as many notes in the old way of fingering as seemed feasible."—*Extract from a letter from Boehm to Clinton, written in March 1843, published in Clinton's Treatise on the Flute*, p. 45.

³ "At that time I had already made in London the model of my new flute, and I showed him [Gordon] everything that I had done."—*Boehm's letter to Coche*. (See Appendix, p. 130.)

⁴ This flute was not patented.

of those inaccuracies of intonation universally complained of in flutes of the usual formation, and are enabled confidently to invite the attention of the musical world to their new patent flute, in which, by a slight alteration in the form and arrangement of the keys, the following important results are obtained, namely:—

“FIRMNESS, EQUALITY, and RICHNESS of tone which have never before been combined in any other description of flute.

“SIMPLICITY of mechanism as regards FINGERING.

“Facility in FILLING, producing sweetness and freedom up to the highest C, and unexampled capabilities for the more delicate graces of expression which belong to a finished style of execution.

“It will accordingly be found that the whole construction of the newly-invented scale of this flute tends to a more complete identification with the natural scale of the harmonic succession of sounds, inasmuch as by means of the simple F key, as exhibited in the annexed drawing, the hole for the note E is placed in its natural situation, which gives to it all the power of the E flat and D. Besides which advantages, its peculiar formation has influence upon several of the high notes, which become better in tune thereby, and more pure, easy, and clear in tone; giving at the same time a facility on several shakes or trills, which could never be made on the flute before.

“In all passages of music, likewise, similar to the annexed examples, where the notes preceding or following the F natural require either the G

sharp key to be opened, or the sixth hole to be closed with the third finger of the right hand, there is a difficulty on the common flutes in gliding to or from the F natural keys, and a partial unstopping of the intermediate holes, which produces a sound between the respective notes, and requires the skill and practice of a first-rate professional artist to surmount the difficulty in such passages of music as are affected thereby; which difficulties and inaccuracies are also obviated by the newly-invented F key as described in the figure subjoined."

On looking at the engraving, it will be observed that the A hole is brought down to its proper place, and that the finger of the performer is enabled to act upon it by means of an open key (*a*), as on the flutes represented in Figs. 3 and 4; but the key, being much shorter than that required for a bass flute, is constructed with a single instead of a double lever. English flute-players are familiar with this key, as it was made use of by Mr. Siccama on his "diatonic flute"—a flute which was adopted by two distinguished professional players, Richardson and Pratten, and became very popular in this country about thirty years ago.

The E hole is also lowered; but

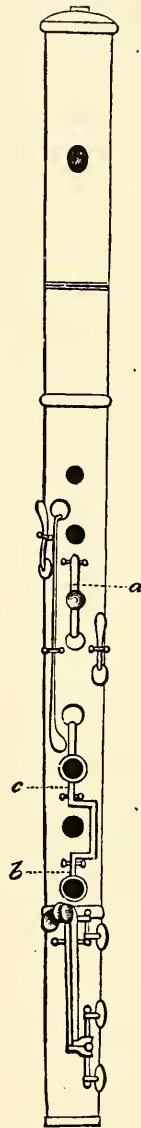


Fig. 8.—Boehm's First Model.

instead of employing, like Mr. Siccama, another key of the same kind, Boehm brings down the first three fingers of the right hand, and has recourse to a ring-key, by means of which he effects his well-known back-fingering for F sharp.

The mechanism employed in the construction of the ring-key is very different from that which Boehm afterwards used; indeed, the invention, regarded from a mechanical point of view, must be considered to be still only half complete, for the rod, or axle, to which the rings and the valve should be attached, as radii parallel to each other, so as to constitute a lever of the third order, is wanting, its place being supplied by two levers of the first order (*b* and *c*); the action being the same as that of the keys of the two bass flutes and of Nolan's ring-key when made with a double lever (Fig. 5, J).

This key for F sharp should, of course, have been constructed with three rings (see the Boehm flute, Fig. 11), but for want of the axle it was impossible, without departing from the simplicity of the mechanism, to employ more than two, the absence of the third being a great drawback to the fingering.

GORDON'S DIATONIC FLUTE.

When Gordon left London after his interview with Boehm, during which he was shown the instrument just described, he went to Paris. Whils in Paris the constructed a flute, which he

made, he says in a letter to Boehm, as well as he could with his own hands. It has been suggested in this work (Note 18, p. 29) that the flute which he thus constructed in Paris may possibly be the original of the instrument about to be considered. This is merely a speculation arising out of a peculiarity of construction, to which I will draw attention, leading to the conjecture that it was designed after Gordon had seen Boehm's first model, but before he had become acquainted with the Boehm flute. But wherever the original may have been constructed, we are told by Boehm that a flute such as is here figured was completed in his workshop at Munich.

The instrument has little in common with Gordon's flute as figured by Coche (Fig. 12). Its holes, placed out of line, betraying a want of knowledge of how to regulate the mechanism, and its clumsy, ill-shaped keys form a marked contrast to the elegant and symmetrical work of the drawing of that instrument. If not made by Gordon himself, it would seem at least to be the work of some 'prentice hand.

It bears no resemblance to the Boehm flute (Fig. 11), but it is based on Boehm's first model (Fig. 8), which Gordon has apparently endeavoured to reproduce with alterations and improvements of his own.

On comparing it with Fig. 8, it will be observed that, in adopting the mechanism for F sharp, Gordon has converted the rings into two rude forms (*e, f*), intended probably to represent crescents. In connection with these he has

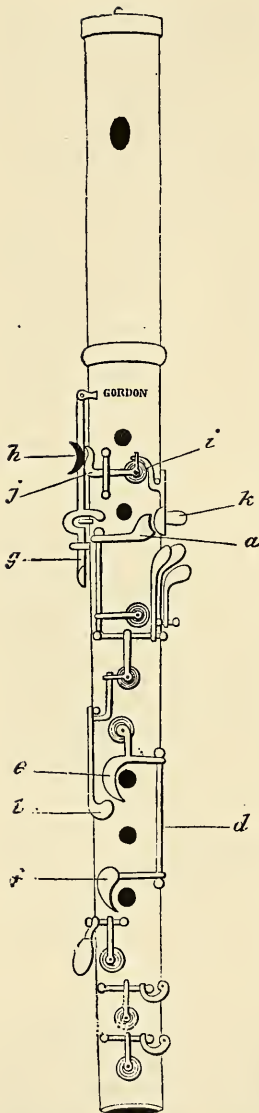


Fig. 9.—Gordon's Diatonic Flute.

made an improvement which constitutes an important mechanical advance on Boehm's contrivance. He has replaced the double lever by an axle (*d*).

Now the reader will recollect that it was pointed out in the description of Boehm's first model, that there was a mechanical difficulty which stood in Boehm's way in furnishing this key with more than two rings. By the introduction of the axle this difficulty was removed. Why, then, did not Gordon make use of a third crescent, which would have been of so much service in facilitating the fingering? Was it because the idea of doing so never occurred to him? If so, it is difficult to resist the inference that when he designed this instrument he had not yet seen the Boehm flute (Fig. 11).

If the reader will now direct his attention to the key for covering the A hole on Boehm's first model (Fig. 8, *a*), and then compare it

with the corresponding key on this flute (*a*), he will see that Gordon has again employed an axle, thereby securing a better action.

It may, perhaps, be worth while to mention that Gordon was not the only designer of flute mechanism who carried out this improvement. Boehm's plan for thus acting on the A hole was adopted not only by him, but by Siccama, Clinton, and Pratten. Siccama simply copied Boehm's key, but both Clinton and Pratten made the same change in it as Gordon.⁵

Boehm, having remedied in the way described the two most glaring defects of the old flute—the incorrect position and size of the A and E holes—made no other changes on his first model in the mechanism of the keys. Not so Gordon; but it must be confessed that, considered as improvements, his alterations are of very doubtful value.

Passing upwards from the A to the key next

⁵ Pratten had recourse to an axle when he changed the name of the instrument on which he played from Siccama's Diatonic to Pratten's Perfected Flute. Clinton does not deny that he took this key from Gerock and Wolf's flute, as the following passage from his *Treatise on the Flute* will show: "The A natural hole I have moved lower down upon the instrument than it was upon the eight-keyed flute, which renders that note perfect. This hole is governed by a key, in order that the finger may act upon it without inconvenient extension. The reader, upon referring back, will observe that this key is somewhat similar in principle to that which was affixed to Messrs. Gerock and Wolf's improved flute, but with a much better action. The key upon that flute was set at a sharp angle, which rendered it awkward to control, while on my flute it is placed horizontally, whereby a free action is obtained." The flute here referred to is not that to which Clinton gave the name of the "Equisonant Flute," but an earlier instrument, made for him by the late Mr. Potter, and still manufactured by his son and successor, Mr. Henry Potter, of 30 Charing Cross.

above it, that for B flat, we see that Gordon has substituted an open for the old closed key, and that, with his extraordinary and inexplicable fondness for crescents, he has provided it with a crescentic appendage (*l*) to receive the left thumb, by which it was played, though it is probable that a flat plate would have answered the purpose much better.

Going higher still, we come to the C natural key (*i*). Here Gordon has introduced an entirely new arrangement. This was rendered the more necessary, as Boehm, as we are told by Clinton, who possessed one of Gerock and Wolf's flutes, had, in improving the A, destroyed the C natural, cross-fingered with the middle finger of the left hand, so constantly used by players on the old flute. Gordon employs the closed C natural key of the eight-keyed flute, but he fits it with two levers, one (*j*) for the left thumb, the other (*k*) for the third finger of the left hand. The expanded end of the latter is brought so close to the plate of the A key (*a*), which is cut away to receive it, that the finger can, when required, slide on to it.

For the three lowest notes C, C sharp, and E flat, Gordon has recourse to the same arrangement as that employed by him on his flute represented by Fig. 12, to the description of which the reader is referred.

The lever *l*, to which no reference has yet been made, was for making G sharp with the first finger of the right hand.

The woodcut is taken from an engraving on the frontispiece of Clinton's 'School for the Boehm

Flute.' In the introduction to this work, Clinton publishes a letter from Boehm, dated August 12th, 1845, in which he thus writes: "As some *interested* parties have circulated various unfounded reports respecting my invention, amongst which they have insinuated that it was copied from Mr. Gordon, I have furnished you with the means to refute all such charges, and should you consider it advisable to publish them, or this letter, you have my full permission to do so."

After making some remarks on other matters, Clinton says: "I now come to the most important part of my subject, namely, the invention itself.

"It has been most ungenerously asserted by some parties that Mr. Boehm *copied* his invention from Mr. Gordon, an amateur, and a captain in the Swiss Guards in Paris; while others, with an affectation of indifference on the subject, quietly assert that the same idea suggested itself to both these individuals about the same period, but that Mr. Boehm, having superior knowledge and facilities, realised his conception, and Mr. Gordon did not.

"The facts of the case are simply these: Twelve months after Mr. Boehm had completed his flute, he met Mr. Gordon in London, who was then busily occupied in devising a reformation of the flute; Mr. Gordon, thinking that Mr. Boehm's workmen were more likely than any others to carry out his ideas, requested permission of the latter to complete his instrument at the manufactory in Munich, which favour was unhesitatingly granted, and in 1834, Mr. Gordon's instrument

was completed, which he called the 'Flûte Diatonique,' a drawing of which is given in the frontispiece. By comparing Mr. Gordon's flute with that of Mr. Boehm, it will be found that every part of it is *totally different*, excepting that which is acted upon by the first, second, and third fingers of the right hand; and even this part, although the same in principle, is differently worked in detail; however, this is the *only* part which could possibly justify any assertion that Boehm had copied from Gordon. Now, to prove that even this part of the instrument originated with Mr. Boehm, Mr. Gordon had thus written: 'La suppression des deux clefs de Fa naturel, et leur remplacement par une clef de Fa dièse, est une idée dont l'application offre de grands avantages. L'idée de cette clef de Fa dièse, communiquée par M. T. Bôhm de Munich, a été, avec son agrément, adoptée pour la présente flûte, dont elle complète les moyens d'exécution.' The original of the above is in my possession, and the following is a translation: 'The dispensing with the two keys for F natural, and replacing them with one key for F sharp, the application of which offers great advantages, was an idea suggested by Mr. Boehm, of Munich, and has been, by his consent, adopted on the present flute, thereby rendering the means of execution perfect.'

"It is now confidently hoped that this honourable acknowledgment from Mr. Gordon himself will establish Mr. Boehm's just claim to the invention. I likewise possess other proofs, equally

satisfactory, but the above may be deemed sufficient on this point."

Clinton's 'School for the Boehm Flute' was published in 1846. In the year following, 1847, Boehm gave the world his own account of the origin of this flute in his pamphlet 'Ueber den Flötenbau.' A translation of the original German of the passage into French will be found at p. 150, whilst the following is a verbatim copy of this account, as it left Boehm's pen when he prepared the abbreviated English version of this pamphlet, known as his 'Essay on the Construction of Flutes':—

"At the beginning of 1832 my new flute was completed and not only known in public by my playing upon it, but I had also sold already several of these instruments, when I received the following letter from Mr. Gordon, the original of which is in my hands.⁶

'LAUSANNE, 15 *fébr.* 1833.

'MON CHER MONSIEUR

'Je suis depuis quinze jours de retour chez moi à Lausanne, après un séjour assez long à Paris, où je suis venu de Londres peu après vous avoir vu, lorsque vous en êtes parti pour Munich.

'Je n'ai pas perdu mon temps, et j'ai travaillé avec persévérance à une flûte nouvelle que j'ai faite moi-même aussi bien que j'ai pu, et que je viens de terminer.

'Je ne vous ai point oublié, et j'ai toujours attendu que vous m'enverriez une flûte perfectionnée que vous proposiez de chercher à faire à

⁶ A translation of this letter is given at p. 419.

votre retour en Allemagne. Selon votre offerte à Londres, je veux vous envoyer ma flûte en vous priant de m'en faire une belle sur ce modèle ; vu que je possède entièrement le doigté pour la jouer. Je vous enverrai en même temps la tablature du doigté.

‘ Je n’ai pas voulu vous envoyer ma flûte avant d’avoir reçu de vos nouvelles. Veuillez donc m’écrire à l’adresse ci-après : *A Monsieur Gordon à Lausanne en Suisse*, et me dire la manière qui vous croyez la plus sûre de vous la faire parvenir sans accident ; et si vous pourriez m’en faire une semblable, vous en occuper le plutôt possible. Dans l’espérance que ma lettre vous trouvera à Munich, je vous l’envoie à l’adresse que vous m’aviez donné.

‘ Acceptez l’assurance de toute ma considération.’

‘ Votre dévoué serviteur,

‘ GORDON.’

⁷ There is a postscript to this letter. It is written partly in French and partly in German. Only the first two or three sentences of it have hitherto been published. It is here given in its entirety.

“ P.S.—Avez-vous toujours votre bon ouvrier dont vous m’avez parlé à Londres ?

“ J’ai vu Drouét à Paris. Il âprouve ma Flûte, mais il recule devant un changement dans le doigté. Tulou en est là aussi. Ce n’est pourtant qu’une affaire de Deux mois.

“ Ich habe ihnen, mein lieber Böhm, nicht mein ganzes Brief auf Teutch geschrieben, weil ich weiss dass sie sehr gut Französisch sprechen und Lesen und dass ich im gegentheil mein Teutsch ganz vergessen habe. Leben sie recht wohl, und schreiben sie mir bald.”

Translation.

“ Have you still your good workman, of whom you spoke to me in London ?

“Some months after my reply to this letter Mr. Gordon came himself to Munich, and soon became convinced of the defects of his flute in comparison to mine. He rejected his system, and began trying another, for the execution of which I allowed him to make use of my workshop and my workmen.⁸ After a twelvemonth, when he had two flutes completely destroyed by continual alterations, he left Munich with the flute represented in Fig. 1 (Fig. 9 of this work). He named his flute quite erroneously *Flûte diatonique*, as only the old flute with six holes is *diatonic*, but all those since furnished with keys are *chromatic*. He published also 1834 an engraved scale to his flute, which he gave to me, and in this scale he observes, among other things: ‘La suppression des deux clefs de Fa naturel,’” &c., as above.

In the preceding paragraph, Mr. R. S. Rockstro would have us believe that there is to be found one of the many false representations which he endeavours to fasten on Boehm. “It is evident,” he writes in his ‘Treatise on the Flute,’ “that the drawing published with Gordon’s scale of

“I saw Drouet at Paris. He approves of my flute, but he recoils before a change in the fingering. So also does Tulou. ’Tis nevertheless but a matter of two months.

[*In German.*]

“I have not written, my dear Boehm, the whole of my letter to you in German, because I know that you speak and write French very well, and that I, on the contrary, have entirely forgotten my German. Farewell, and write to me soon.”

⁸ In the German pamphlet Boehm added here: “what he was in search of was a simplified mechanism which should permit him to retain several of the ordinary fingerings.”

fingering was not a representation of the flute to which Boehm alludes, as he implies, but of that ”⁹ depicted in Fig. 12, p. 107, the instrument which Coche brought forward as Gordon’s flute. How, when, or where it becomes evident we are not told ; it is enough for us to know that it has been perceived by Mr. Rockstro’s mental eye. It will be observed that it is not only Boehm whose veracity is here impugned. Mr. Rockstro indirectly charges Clinton, also a dead man, with being an accomplice in this fraudulent attempt to deceive the world ; for Clinton, as we have just seen, had stated that when he wrote the introduction to his ‘School for the Boehm Flute,’ the original of Gordon’s declaration was in his possession.¹⁰ To the method of writing history adopted by Mr. Rockstro, of which this is a sample, I shall have again and again to draw attention.

It happens, however, that the copy of the “engraved scale to his flute” which Gordon gave to Boehm, and which Boehm placed in Clinton’s hands, is still in existence—a circumstance of

⁹ *Treatise on the Flute*, Section 576, p. 319.

¹⁰ That Clinton spoke the truth when he asserted that the original of Gordon’s acknowledgment was in his hands, is proved by the following extract from a letter from Clinton to Boehm, which shows that Boehm lent Clinton the copy which Gordon had given him of the announcement of his flute. The letter was written in December 1845, after the plates for Clinton’s *School for the Boehm Flute* were engraved, but before the work was published. “I enclose you,” he writes, “two of the drawings I have had made, one of *your* flute and one of *Gordon’s*, which I give by way of comparison, in order to *prove* that you did not copy from him. In the text of my work I have given an extract from that paper of Gordon’s which you lent me, which acknowledges that *he copied from you.*” The words italicised are underscored by Clinton.

which Mr. Rockstro was not aware when the revelation was vouchsafed to his mental eye. Through the kindness of Herr Ludwig Boehm, in whose custody it is, I am able to place before the reader a facsimile, reduced in size for the sake of convenience, of this document, which has been for so many years the subject of doubt, curiosity, and speculation. The following is a translation of the letterpress which covers the first page :—

“DIATONIC FLUTE.

“The Flute as it is known at the present day is a very imperfect Musical Instrument. Flute Concertos are played with great Talent, for Talent is a Magician ; but the truth is that one cannot in any Key make a good Scale on the Flute. In loading it with new Keys they have only made it more complicated, without changing its defective Conformation, the sole way to improve it. These Keys, moreover, as well as the Holes, are not in their true place ; many Notes have not a sufficient length of Column of air, whence, partly, the indecision, the inequality, and the defective intonation of the greater part of these Notes.

“The Study of this Instrument in its present state, is a constant struggle with these defects, which one can succeed in palliating, in disguising more or less successfully, but never in entirely overcoming, because they lie in the structure of the Instrument, which does not sufficiently second the Musician who plays it.

“ It was then to be desired that the Flute, the Taste for which is so widely diffused, should at length be brought more into conformity with the dictates of reason, and constructed in such a way as to yield, in conjunction with greater ease of Study, more satisfactory results in relation to the tone, the Correctness of the Intervals (which the Name *Diatonic* should express), and of the equality of the Notes—in one word, new means which should favour execution, free and suitable for melody, and for brilliant passages in all the Keys.

“ We believe that these advantages are combined in the New Flute which we to-day announce to the Musical World.—The new distribution of the Instrument necessarily involves a slight change in the ordinary fingering (see the subjoined Table). This fingering thus modified is clearly more simple. Experience has proved that it is acquired in a short Time.

“ The mechanism and the position of the Keys, eight in number, are well calculated to insure precision, certainty, and facility of action. The Flute, supported on the inner part of the Left hand, leaves the Fingers free from any contraction.”

“ The Key for G sharp and that for C are the only closed Keys on the Flute. These two Keys are opened by pressing the finger upon that which is indicated by the sign X. The six other Keys stand open; their Holes are closed like the other holes of the Flute by the pressure of the fingers.

¹¹ This passage seems to indicate that Gordon, like Boehm and Coche, used a crutch or some such contrivance.

“The suppression of the two Keys for F natural, and their replacement by one Key for F sharp, is an Idea the application of which offers great advantages. The Idea of this key for F sharp, communicated by Mr. T. Boehm, of Munich, has been, with his consent, adopted for the present Flute, of which it completes the means of execution.

“An amateur moderately advanced, will acquire after two months' practice the fingering of the new Flute, and from that time forward, seconded by his instrument, his further Study should assure him rapid progress.”

The two inner pages of the announcement are devoted to the drawing of the flute and to the *tablature*, or table of fingering. The back, which is otherwise blank, is adorned with a picture. It represents the interior of a room. In the centre of the apartment stands a harp, and, near it, a chair, in which, judging from its position, the harpist was accustomed to sit. Close to the chair, on a small mat, there lies a lap-dog. Not far off is a music stool, and, in front of it, a music stand with the desk lowered sufficiently to enable a performer to play from it when seated on the stool. On the ledge of the desk is Gordon's flute, with the holes turned towards the spectator, so that the mechanism can be seen and identified. Over the flute is written its superscription, “Flute Diatonique, par J. Gordon.”

The room is lighted by a richly curtained French window looking into a garden. The window, which is enclustered with flowers,

discloses a charming view ; it overlooks a sheet of water which mirrors a cloudless sky, whilst hills, bathed in sunshine, are seen rising picturesquely, side by side, almost from the water's edge. In the garden, which appears to slope rapidly downwards, is a serpentine gravel walk leading, seemingly, towards the water.

The picture may be nothing more than a conventional design, intended as an ornamental vehicle for the title of Gordon's flute ; but a flute-player of an imaginative turn of mind might be tempted to put on it a very different interpretation. He might see in it a representation of the drawing-room in Gordon's house at Lausanne. He would observe that although the balmy breath of summer, laden with the fragrance of the garden, floats through the open window, the ample curtains, looped up in massive folds, tell of the rigour of a Swiss winter. In the fringed valance which adorns the chair and the music stool his mental sight would recognise the handiwork of Gordon's clever, devoted, and domesticated wife. To him it would seem that the last strains of a duet for harp and flute, which Madame Gordon had been playing with her husband, could not long have died away, for their tiny audience still lingers in the place by its mistress's side it occupied during the concert. The quondam little listener would reveal to the dreamer the secret of Gordon's expatriation. He would trace in the lineaments of the highly honoured pet reposing on its dainty cushion the outline of a King Charles's spaniel ; to him an indication that Gordon's was one of the many

Flûte Diatonique

La Flûte telle qu'elle est connue aujourd'hui, est un Instrument de Musique très imparfait on jou des Concertos de Flûte, avec beaucoup de Talent, par ce que le Talent est un Magicien; mais la vérité est qu'on ne peut, dans aucun Ton faire une bonne œuvre sur la Flûte. En la chargeant de Clefs nouvelles on n'a fait que la compliquer davantage, sans changer sa Conformation vicieuse, seul moyen de la rendre meilleure. Ces clefs d'ailleurs ainsi que les Trous ne sont pas à leur véritable place, plusieurs Tons n'ont pas une longueur de Colonne d'air suffisante, de là, en partie, l'indécision, l'irrégularité et la fausseté de la plupart de ces Tons.

L'Etude de cet Instrument dans son état actuel, est une lutte continuelle avec ces défauts, que l'on peut parvenir à palier, à deguiser plus ou moins bien, mais jamais à surmonter entièrement parcequ'ils tiennent à la structure de l'Instrument qui ne seconde point assez le Musicien qui le joue.

Il étoit donc à désirer que la Flûte, dont le Goût est si répandu, fut enfin mieux raisonnée, et construite de manière à offrir avec une Etude plus facile des résultats plus satisfaisans, sous le rapport de la sonorité, de la Justesse des Intervales (se que doit exprimer le Nom *Diatonique*) et de l'égalité de Tons, en un mot des moyens nouveaux qui favoriseroient l'exécution franche et convenable du chant et du Trait dans tous les Tons.

Nous croions ces avantages réunis dans la Nouvelle Flûte que nous annonçons aujourd'hui au Monde Musical. — La distribution nouvelle de l'Instrument a eu pour conséquence nécessaire un léger changement dans le doité ordinaire (Voir la Tablature ci-jointe). Ce doité ainsi modifié est évidemment plus simple. L'expérience a prouvé qu'il s'acquiert en peu de Temps.

Le mécanisme et la position des Clefs, au nombre de huit, sont bien entendus pour la précision, la sûreté, et la facilité de leur action. La Flûte, soutenue sur la partie intérieure de la main gauche, laisse les Doits libres de toute contraction.

La Clef de Sol Dièze et celle de Ut sont les seules Clefs fermées de la Flûte. Les deux Clefs sont tenues en appuyant le doigt dessus ce qui est indiqué par le Signe X. Les six autres Clefs sont ouvertes; leurs Trous se ferment comme les autres trous de la Flûte par la pression des Doigts.

La suppression des deux Clefs de Fa naturel, et leur remplacement par une Clef de Fa dièze, est une Idée dont l'application offre de grands avantages. L'Idée de cette clef de Fa dièze communiquée par M. F. Böhm de Munich a été, avec son agrément, adoptée pour la présente Flûte, dont elle complète les moyens d'exécution.

Un amateur de force moyenne, possédera après deux mois d'Exercice le doité de la nouvelle Flûte, et dès lors secondé par son Instrument, son Etude ultérieure doit lui assurer de rapides Progrès.



Tablature de la Flûte Diatonique.

Les Lettres A, B, C, D, E, designent diverses Branches communiquant à des Clefs et servent aux Trilles. Le Trille *major* et *mineur* de chaque Note est indiqué par le Signe *gr* dans la Colonne du Doigt de cette Note, Savoir le trille *mineur* *arcs*, et le trille *major* *verts* (la dite indication) du Doigt.

Autres Doigts

ut Re Fa Sol La Si^b ut² Re² Fa² Sol²

- * Chaque fois que la *Fa* dix^e grave ou celui du milieu précéderont immédiatement une Note pour laquelle le cinquième trou doit être fermé, on fermera ce trou en prenant la clef de *Fa* dix^e.
- * La clef de *Mi* b mol pouvant indifféremment être ouverte ou fermée (pour toutes les voix pour lesquelles elle n'est pas indiquée fermée) on a la faute de la laisser dans la position qu'on traversa la plus commode pour la main dans l'exécution du Trille.

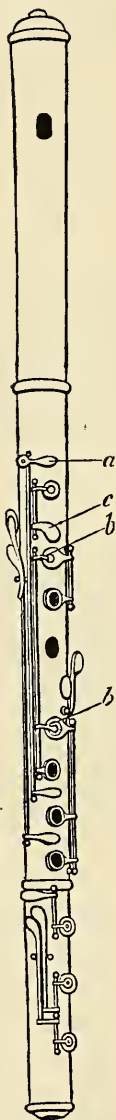


Fig. 11.
The Boehm
Flute.

whatever might have been Gordon's Christian name, if the engraver of the picture had before him a signature similar to that above, it is certainly not surprising that he should have believed that Gordon had written J. Gordon. It will be observed that the letter *d* in Gordon's name, as it appears in the picture, is so engraved as to resemble the same letter as formed by Gordon in his signature.

THE BOEHM FLUTE.

1832.

The engraving represents this instrument in its original form. Boehm commenced its construction on his return home from London in 1831, and he is stated to have played it in public on November 1st, 1832.¹² It made its appearance in England in 1833.¹³

The change of fingering for the right hand, introduced on Boehm's first model (Fig. 8), is here retained. The ring-key is now constructed with an axle, and a third ring is added to the mechanism for F sharp.

¹² See p. 253.

¹³ *Essay on the Construction of Flutes*, p. 13. See also *infra*, p. 278.

The open-keyed system is extended to the left hand; the C natural, the B flat, and the G sharp holes, which were left covered with closed keys on Boehm's first model, having been opened. The G sharp key is played, as before, with the little finger of the left hand, but it is kept open by a spring. For C natural an openstanding key, as previously proposed by G. Weber, and before him by Tromlitz, is adopted. As there are now six open holes with only five fingers available for closing them, it becomes necessary to use a ring-key and thus to have recourse to a second back-fingering. The key selected to be acted on in this way is that by which B flat is made. It is closed by the action of the first finger of the right hand, an arrangement which Gordon has been said to be the first to adopt. It is, however, only fair towards Boehm to bear in mind that this, as has already been pointed out,¹⁴ is a matter of inference only, the earliest flute of which a drawing is known to exist showing this fingering, being that now before us.

The key for closing the A hole (Fig. 8, *a*) is discarded, the third finger of the left hand being brought down so as to cover the hole; the other fingers of the left hand are lowered with it, and a key (*c*) is introduced, as on MacGregor's bass flute, to enable the first finger to act on the C sharp hole, from which it is now removed.

The fingering of the Boehm flute is too familiar to need further description, but the reader's atten-

¹⁴ *Supra*, p. 23, Note 7.

tion should be drawn to the projection (*a*) for the spring of the D-shake key, the needle springs¹⁵ not having been yet brought into use, and to the arms (*b*, *b*) for closing the valves over which they extend, now superseded by clutches,¹⁵ or projections from the axles, meeting each other. The absence of the Briccialdi lever for making B flat with the left thumb will also be noticed.

GORDON'S FLUTE ACCORDING TO COCHE.

The drawing here reproduced was brought forward by Coche as a representation of Gordon's flute, when, after the failure of his proposal for "private arrangements" with Boehm, he offered his fellow-countrymen a flute improved by himself. He, however, draws special attention by a *nota bene* to a statement, which he makes on the authority of 'Gordon's Tablature,' that two of the keys, viz. that for F sharp and that for shaking D, belong to Boehm.¹⁶

The open-keyed system now reaches its full development. Every one of the keys (with the exception, of course, of that for the shake), including even the E flat, which Boehm did not alter, stands open when not in use. In its fingering it departs still more widely from the old system than does the Boehm flute; for though it

¹⁵ Invented by Buffet, of Paris, p. 49.

¹⁶ *Infra*, p. 273, at the foot of the engraving.

retains one fingering (that for G sharp) which Boehm changed, it changes three (E flat, low C, and C sharp) which he retained.

The statements of Buffet,¹⁷ the representations of Coche,¹⁸ the letter of Gordon to Mercier,¹⁹ and that to Coche from Madame Gordon,²⁰ who speaks of her husband as having made his instrument, of which she enclosed a drawing, with a workman of Boehm, all combine to show, unless we are to impute error, fraud, or misrepresentation, that the flute here depicted was constructed in Boehm's factory at Munich in the year 1833. On the other hand, so grave are the difficulties in the way of accepting this figure as a drawing taken from an instrument actually made,²¹ that it has been thought that it may possibly be nothing more than a design on paper in which Gordon has attempted to adapt the Boehm flute to his method of construction. On these points it will be for the reader

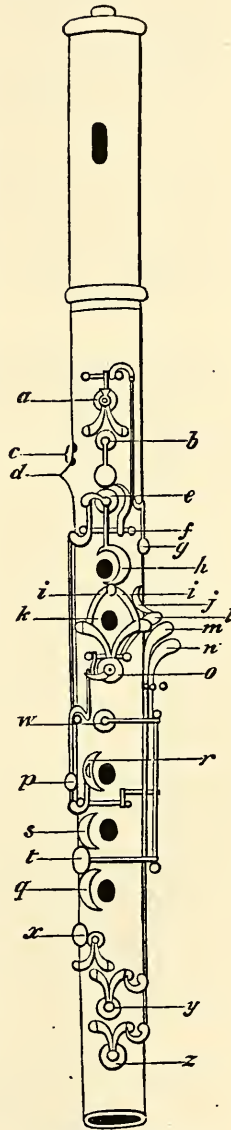


Fig. 12.—Gordon's Flute according to Coche.

¹⁷ *Infra*, p. 282.

¹⁸ *Infra*, p. 125.

¹⁹ *Infra*, p. 132.

²⁰ *Infra*, p. 127.

²¹ *Infra*, p. 286.

to use his judgment, or to exercise his ingenuity in endeavouring to discover a satisfactory elucidation of the mystery.

The engraving is a facsimile (photography being employed to make it smaller) of that published by Coche, who implies, though he does not state, that it corresponds to the drawing forwarded to him by Madame Gordon.²²

EXPLANATION.

a. D-shake key taken from the Boehm flute ; the mechanism altered to Gordon's system of wires and cranks. It was played by means of the knob or button, *g*.

b. Key to close the C sharp hole. This very long key worked upon the axle *f*; its shank was brought round the key *e* by a sickle-shaped curvature, underneath which was the spring.

c. Two small holes for C natural. They were closed by the left thumb.

d. Projection in the wood to keep the thumb in its place.

e. Key for closing the B natural hole. B flat was made by closing this key by the first finger of the right hand, the action being brought up from the crescent *r* by wires and cranks.

h. Crescent to close the key *e*. If this key worked on the axle *f*, there must have been some contrivance not shown in the engraving for reversing the action.

o. G sharp key. This key was open when in repose, but when the finger was applied to the hole *k*, it was carried down and closed by means of the arms *i, i*, one of which was furnished with a small crescent *j*. This double-action key, with simplified mechanism, was afterwards known as the Dorus key.

l. Tail of the G sharp key.

m, n. Tails of the low C and C sharp keys, communicating with the valves *y, z*, by wires and cranks.

p. Knob for shaking G and G sharp with the first finger of the right hand.

w, r, s, g. Mechanism for F sharp. The idea taken from Boehm, the rings replaced by crescents.

t. Button to make F sharp without using either of the crescents.

x. Open-standing E flat key.

²² *Infra*, p. 125.

APPENDIX TO PART I.

THREE LETTERS

TO WHICH REFERENCE IS MADE IN THE ACCOUNT GIVEN IN THIS WORK¹ OF THE INTRODUCTION OF THE BOEHM FLUTE INTO FRANCE.

THESE letters, the originals of which are in the possession of Herr Ludwig Boehm, are now (1895) published for the first time. They disclose a vista which forms a strange background to the likeness we have of Coche, painted by himself and retouched by Mr. Rockstro, in which he is represented "manfully standing forth," at the instigation of offended Justice, "as the champion of the ingenious but unfortunate Captain Gordon."² The sketch for the portrait was taken when Coche, in the discharge of a duty he owed to himself—the duty of endeavouring "to ascertain the truth"³—was engaged in "collecting and sifting the conflicting evidence" on which Gordon's title to be considered the real inventor of the Boehm flute rested. He was posing in the attitude of a "conscientious⁴ artist" animated by a spirit which would be, were it not "for a certain tendency to over-estimate the merits of Boehm,"⁵ "a spirit of judicial impartiality." Still, Coche, though "actuated" by the most "honourable motives,"⁶ does not appear to be absolutely immaculate, even after the picture has been varnished by Mr. Rockstro. The varnisher has detected a flaw in the

¹ *Supra*, pp. 49 to 72.

² Rockstro's *Treatise on the Flute*, section 923, p. 630.

³ See Coche's attack on Boehm, *infra*, p. 124. ⁴ *Ibid.*

⁵ Rockstro's *Treatise on the Flute*, section 609, p. 341.

⁶ *Ibid.*, section 615, p. 345.

colouring. Coche "seems to have erred," we are told ; but he erred "on the side of excessive generosity towards" the culprit whose guilt he was labouring to bring to light.⁷ In short, so distinct is the halo of righteousness with which the figure is adorned that Mr. Rockstro has been accustomed to regard it with feelings akin to the reverence due to the image of a saint. But the great marvel of this masterpiece of art—a marvel on which the letters throw light—has still to be noticed. The painting is endowed with the mysterious property of the chameleon. No sooner is the chivalrous exploit of the knight-errant of the flute placed in the magic lantern of fact than it dissolves into an astutely planned trade manœuvre.

In the first of the letters Coche informs Boehm, under the seal of secrecy, that he believes the possibility of getting Boehm's "magnificent and rich instrument" adopted by the Institute of France to be within his grasp. He suggests that the powers of the law should be invoked to put a stop to the manufacture of the Boehm flute, then just commencing in France, thus to compel those Frenchmen who desired to adopt the new invention to obtain their instruments from a depot to be opened by Boehm in Paris. Although he professes to make this proposal from a wish to promote Boehm's interest, he hints, in guarded but unmistakable language, that he is not indisposed to take a share of the profits which might be expected to accrue from the monopoly to be thus established.

The answer which Boehm returned to this letter is not preserved, but we gather from the opening sentences of letter No. 3 that he informed Coche that he had already commissioned Camus to introduce his flute into France. In these same sentences we catch a glimpse of a transformation scene. Coche was not the man to submit tamely to a rebuff. He had quickly resolved to

⁷ Rockstro's *Treatise on the Flute*, section 6c5, p. 339.

forge a weapon to bring his rival, Camus, to the ground. The public, who were to be the judges of the contest, would reward the victor with a crown of gold. Accordingly, the richness of the "magnificent" instrument for which Camus was the agent was called in question; Coche had "presided at the construction" of a flute "enriched" by himself, and in little more than four months from the time when he had suggested that his countrymen should be forced to buy their flutes at Boehm's Paris depot, was inviting them to purchase his own superior home-made article, the adoption of which by the Institute of France he had already secured.

The second letter is unsigned, but there is internal evidence, which seems overwhelming, that it was written by Boehm's agent Camus. The carelessness displayed in the writing and the composition, together with the occasional erasures and other indications of haste, show that it was the reverse of a studied production. Whether the omission of the signature was accidental; whether, as well may be, it arose from an unwillingness on the part of the writer to make himself responsible for the very plain speaking the letter contains; or whether it was a measure of precaution to prevent his name from being used for a fraudulent purpose, he having given Boehm authority to draw on him for a sum of money, I shall leave to the judgment of the reader.

The letter was written about three weeks after the adoption of Coche's flute by the Institute. Camus, assuming him to have been the writer, seems to have endeavoured to ward off the impending blow; but he was no match for the clever Coche. The anger he betrays indicates clearly enough that he felt himself to be the beaten party; indeed, he makes no attempt to disguise his defeat: "The intrigues have succeeded," he tells Boehm, "and you and I are put aside (*mis à l'écart*)."

Having vanquished the agent, Coche now determines

to measure himself with the principal. In the third letter he represents Boehm as having retreated behind Camus, follows him to his alleged retreat, and proceeds to pave the way for his pictorial achievement, the production of an engraving which shows at a glance his superiority, as a flute constructor, over Boehm; the engraving being so designed that he who runs may read that Coche was a perfecter, whilst Boehm was only a modifier.

The letter shows what a perfect master was Coche of the tactics of inimical correspondence. To the diplomatist it affords an example of the method of throwing an opponent off his guard by expressing an earnest wish to protect his interest, to defend his character, and to wipe a stain from his honour. The epistolary strategist will see how, by the dexterous use of calumny passed through an anonymous mouth, an antagonist can be driven into a pitfall, where he is compelled to prove a negative, and at the same time forced to defend himself in the dark; whilst the student of the art of taunting, who desires to know how to sharpen the barbs of sarcasm to a needle-point, will learn that insult and invective can be covered with a veil woven out of self-exaltation combined with the profession of a desire to uphold justice and to put slander to silence.

NO. I.

From Coche to Boehm.

PARIS, *the 26th November, 1837.*

MY DEAR SIR,

I cannot express to you all the admiration I feel every day as I work at your magnificent and rich instrument, which is destined to make one of the most remarkable of revolutions in wind instruments. It is therefore with great ardour that I study it; may I some day become

worthy by my execution to share the suffrages which belong by right to this beautiful invention.

I ought to inform you, my dear Sir, that an instrument maker of the name of Clair Godefroy, the elder, has made an exact copy of your instrument, and, what is more, has placed his name upon it as if he was the inventor of it. I conceive, then, that it would be to your interest to come to Paris and take out a patent for invention and importation, and then you would be the only maker able to manufacture it.

I am entirely in ignorance as to what are your intentions on this subject; perhaps you do not mind counterfeits being made, but as I was in doubt, I have taken all the precautions possible to prevent this happening; so you may judge of my astonishment when I saw your instrument copied and exhibited in a passage of the capital.

I beg you, then, to keep this letter Secret, to tell me to what professional players, and to what persons you have sent your flute, and what are your intentions on the subject of the counterfeit.

I have got it heard by the members of the Institute, Messrs. Cherubini, Paër, Auber, Berton, Halévy; I believe that I have in my hands the possibility of getting your instrument adopted, and if private arrangements may be agreeable to you, supposing that you are intending to establish a depot at Paris, we could come to an understanding on this subject.

Be assured of the admiration of your devoted,

V. COCHE.

Do not forget, I beg you, the music of your composition which you have promised me.

No. 1, Violet Passage—Coché.

NO. 2.

Addressed to Boehm, written presumably by Camus.

PARIS, *the 19th April, 1838.*

MY DEAR SIR,

I have had the good fortune to dispose of the two last flutes that you have sent me ; unfortunately for me they were purchased by professionals, but at least, I am pleased on your account. The flute sent for Mr. Guibal, of Epernon, turns out in this way to be sold to another person, but he has not come to fetch it, and it has given me a fright, for I know this man too well not to congratulate myself on it : this flute had two heads, but I have been obliged to give one of them to an amateur of Bordeaux whose flute was completely cracked. Draw a *bill at five days' sight on me for five hundred and forty francs* (540 frs.), or, if you must come here, you will find this sum awaiting you—do as you please. I have again had many contrarities, in spite of all the steps I have taken, and in spite of all your letters which I posted myself, the intrigues have succeeded. Mr. Coche has presented a perfected flute, he has played it at the Institute, and in a report, it has been (stated) that *before the discovery of Mr. Coche* the flutes were defective, but thanks to his *discovery*, &c., &c., he has got this inserted in all the newspapers, and you and I are put aside.

His discovery consists, I believe, in making the key for the fourth finger to be closed, as well as that for the thumb.

Godfroy also has put one or two articles into the newspapers, and I have taken care that he speaks of you, and that he re-establishes that to which you are entitled. But as regards the Institute, the mischief is done. I very much wish that you could come hither, but I do not invite you, for, as for your interests, they would gain nothing by your visit. Still, if you are going to

England this year, you must try to stay a short time in Paris to make the newspapers say a few words, and to try to give the lie to the liars and the intriguers.

Adieu, my dear Mr. Boehm; if you are not coming, let me hear from you.

NO. 3.

From Coche to Boehm.

PARIS, *the 25th May*, 1838.

SIR,

If I have not replied to your letter it is because I was desirous of waiting for the result of the sitting of the Institute at which your flute was to be judged. This sitting, by successive adjournments, has postponed for nearly three months the date at which your flute and my work were to be judged; but you had already empowered Mr. Camus to make the most of your invention; you had in a manner withdrawn yourself behind him, and as for me, there was nothing more than to produce the report of the Institute and to play on the flute enriched with my improvements in order that the public could judge between Mr. Camus and me; an answer would have been to no purpose. It is amongst professionals that the question must be decided.

Just now, Sir, there arises a slight difficulty, of little importance after all to the flautists who will play your flute, but which interests in the highest degree the inventor. It is said in professional society that the flute which bears your name was discovered and invented with all its present improvements by a person of the name of *Gordon*, an old pupil of Drouet; that this Gordon after devoting several years to experiments and labours, has given up on account of illness occupying himself with his flute, and that your discovery, in one word, is no other than his. I, Sir, who have corresponded with you, exclaimed against such an assertion, because

your letters contain nothing to make it appear to me ; but at this conjuncture it is the *amour propre* of the inventor which is involved, and I consider that I am rendering you a service in writing to you to beg you to put me in position to reply to all the wranglings by a formal denial. I repeat, Sir, that it makes little difference to me whether the new flute is of your invention or Gordon's, the public will not adopt it less quickly whether it bears your name or that of another ; but it is to your interest to destroy all the suppositions, and that is why I am writing to you. Any one else, perhaps, would trouble himself very little about the dispute on the subject of the invention, and would seek to substitute himself in place of the one or the other inventor, or of both of them together ; but, Sir, I act more frankly, and inform you of what is going on. I await then your reply : up to the 15th of June next I shall make use of it to put to silence the slanderers and to have justice done you. But whatever may be the truth, do not keep me waiting for your letter, for I feel sure that you will not by your silence put me in a position to suppose that your invention has an origin other than that avowed by you. As you are the only person interested in the question, be so good as to write me as soon as possible, and be assured of the great Regard of

Your most faithful servant,

V. CÖCHE.

BERTON'S REPORT
ON COCHE'S IMPROVEMENTS IN THE
BOEHM FLUTE.

THIS report is so little creditable to those concerned, and so derogatory to the Institute of France whose great name it drags into the mire, that in the two previous editions of this work I quoted it only in the original French ; but, as it is now brought more into prominence owing to the circumstances under which it was obtained having been made public, I purpose turning it into English.

The writer, Henry Montan Berton, though not so well known as either of the five other distinguished musicians, Cherubini, Paër, Auber, Halévy, and Carafa, who signed the report, was nevertheless a man of mark. He was reared in a musical atmosphere, his father being a singer, an operatic composer, and a celebrated conductor. He entered the orchestra of the Italian Opera as a violinist, according to Fétis, at the age of fifteen ; when he was nineteen some of his earlier works, consisting of oratorios and cantatas, were publicly performed, and in his twenty-first year his first opera was brought out. The numerous operas he afterwards produced, though not rising to the first rank as compositions, gave proof of his ability for skilful treatment, and contained passages of great melodic beauty. He at one time wielded the baton at the Italian Opera, and he was for many years professor of Harmony in the Conservatoire of Music. Nor was he unknown in the field of literature. He wrote for newspapers, contributed articles to an encyclopædia, published an elaborate book on Harmony, and drew up many reports on subjects connected with music, to be brought before the Institute of France. He was admitted to that distinguished body in 1815, when the number of its musical members, or the Section of Music

of the Royal Academy of Fine Arts of the Institute, as they were collectively termed, was raised from three to six.

Berton was born in 1767, so that when he wrote the report on Coche's improvements in the Boehm flute he was upwards of seventy years of age. By that time he had outlived his reputation; his later compositions had proved far inferior to his earlier works, whilst he had been so ill advised as to indulge in an intemperate attack on the music of Rossini, when the star of that great genius was beginning to rise. Moreover, his circumstances had been adversely affected by the failure of the Opéra Comique, to which institution he had sold the right of performing his works for an annuity of 3000 francs. An idea of his fitness for the task of examining and estimating the worth of the improvements which Coche professed to have effected in the Boehm flute, may be gathered from the circumstance that he admits that he had obtained such information as he possessed on the subject of flutes and flute construction from a conversation with a scientist who was a tolerably good amateur flute-player. It can occasion, therefore, no surprise that he does not attempt to describe, much less to criticise the improvements which Coche claimed to have made, his method of judging being to take Coche at his own valuation. Indeed, so bent was he on eulogising his brother professor, that in a letter he wrote when forwarding to him the certified copy of his report—a letter which Coche, it is almost needless to say, did not fail to publish—he does not even mention Boehm's name, but ascribes to Coche alone the boon the new flute had conferred on the musical world. The letter runs thus :

“ SIR,

“ I forward you the copy of my report to the Institute, and I consider that you will take an useful step in publishing the opinion of those who signed this report on the importance of your work; not only have you deserved well of your professional brethren in devoting

your energies and your lucubrations to the study and the construction of the new instrument, but composers will be infinitely indebted to you for rendering the use of this flute more easy, so that for the future they will not be stopped by obstacles of old insurmountable. Now one will be able to employ the flute without misgiving or restriction throughout the extent of the chromatic scale, because we find in every part of it equality of tone, perfect intonation in all the keys, improved mechanism which is not more noisy than that of the other wind instruments, a possibility of executing the music of your illustrious master Tulou and all the shakes, high and low, on your instrument.¹ These advantages were more than sufficient to induce the Academy to ratify the report of which you can feel proud.

“I am, yours with regards,

H. BERTON.”

¹ The contents of Berton's letter were, for the most part, a reflection of statements made by Coche in the pamphlet he had presented to the judges. The allusion to the alleged impossibility of executing the music of Tulou on the Boehm flute had reference to the following passage (p. 15): “It is evident that, after my changes, the keys, which were easy on the old, remain easy on the new flute, and that no music is excluded, as many professional players have sought to make believe, asserting that the greater part of the compositions of our celebrated flautist M. Tulou could not be executed on the new flute. Moreover, only two-thirds of the notes of the diapason are made with the old fingering, and in those which have undergone some changes there still remains a very great analogy with the primitive fingering.”

To understand Coche's meaning, it should be borne in mind that the greater part of Tulou's solos, as well, indeed, as those of other composers for the old flute, were written in keys in which there was no G sharp or A flat (such as C major, G major, F major). When playing in such keys on the Boehm flute with the open G sharp it was necessary to keep the little finger of the left hand employed in pressing on the G sharp key, but by restoring the closed G sharp key of the old flute, where the work of closing the key was done by the spring, Coche, like Dorus and Mr. Radcliff, set the little finger at liberty, and thus got rid of the cramping effect produced on the second and third fingers—a subject already discussed in note, p. 56.

The report, as published by Coche, was headed by a certificate, as follows:—

“INSTITUTE OF FRANCE.

ROYAL ACADEMY OF FINE ARTS.

The permanent Secretary of the Academy certifies that the following is an extract from the proceedings of the sitting of Saturday, the 24th of March, 1838.”

It is addressed to the members of the Academy of Fine Arts, before whom it was read. The following is a translation:—

“GENTLEMEN,

“In compliance with the request which has been made you by the Minister of the Interior, you have referred to your Section of Music the examination of the improvements introduced into the construction of the flutes, called ‘Flutes on the Boehm system,’ by M. COCHE, flute professor in our Conservatoire de Musique, and author of a method intended to facilitate the teaching and the study of this new instrument. We have applied ourselves to this examination, and I am about to have the honour of reading to you the report in which your Section of Music has embodied its opinion on the merits of this flute, and those of the *method* written by M. Coche.

“The musical instrument to which the name of flute is given is unquestionably one of the earliest invented of instruments, and, from the Pan flute down to those now in use, which are called *transverse* flutes because they are played *transversely*, the form and the means of execution have continually undergone great changes, and it cannot be a matter of doubt that these various changes had no other object than to endeavour to correct the faults of

intonation inherent in the construction of the ancient flutes. We are of opinion that the inventor of this new make has attained this object, and we are about to acquaint you with the means he has known how to employ for its attainment.

“The enlightened, men of science as well as artists, have always been of opinion that it would be almost impossible to succeed in constructing a flute which, according to the laws of acoustics, should be acknowledged to be perfectly in tune throughout the whole extent of its compass, and that it is only through the skill of the gifted executant that it often appears to us to be so ; and they ground this assertion on the following reasons. One of them, the celebrated Charles, your illustrious colleague of the Academy of Sciences, a distinguished amateur of music and a tolerably good flute-player, told us, in conversing with us, that he greatly regretted having studied this instrument rather than the violin, an instrument on which one can succeed in playing strictly in tune, whereas on the flute this would appear to him to be impossible, for the reason that its construction was defective in several points. First, that the embouchure presented a great difficulty to be surmounted, that of filling (*l'insufflation*), for in introducing the column of air into the tube one could not avoid losing a part of it, which passes to the outside, and that in this way a portion of the power of the tone and the means of controlling it with certainty were unavoidably destroyed ;² secondly, that the boring of the holes was,

² The statement that the column of air, of the “fractions” of which Coche had discoursed in his pamphlet, was introduced into the flute by the performer is too much even for Mr. Rockstro, who, as I have already mentioned, writes, “It will be seen from this remark that the illustrious Charles did not quite understand the subject on which he was conversing, or else that his words were imperfectly reported.” Coche, though he did not speak of introducing the column of air through the mouth hole, had written thus: “With a view of facilitating the respiration and the formation

mathematically and acoustically speaking faulty, for the position assigned to the holes was only calculated with reference to the possible extension of the human fingers, and not according to the immutable laws of physics; thirdly, that throughout the whole extent of its compass there was a great number of vague sounds, especially those that one desires to bring out in the deep part, and that those of the acute region were often too much so; in short, that the sounds of the different registers of the flute did not appear to be all of the same family; fourthly, that it was impossible to make on such or such a note shakes, improperly termed cadences; and that of a certainty, notwithstanding its flexibility, notwithstanding the sweetness of its tones, the flute would continue to be an imperfect instrument until the time should come when a man of ingenuity should find the means of remedying all these defects, and artists possessed of skill and of sufficient courage to relinquish their old habits, and to make the inventions conspicuous—inventions of novelty, and of use in cultivating the fine arts.

of the tone Boehm has made at the side of the embouchure an excavation where the lower lip rests. Whence the pencil (*rayon*) of air is more concentrated, and one succeeds in a short time in avoiding the troublesome hissing caused by the lost particles (*parcelles perdues*) of this pencil, which in the ordinary flute is too much extended, and is spread far and wide.”—*Examen Critique*, p. 15.

It was once considered to be of essential importance for the production of a good tone that the stream should so pass through the embouchure into the flute as to fill the interior of the instrument, the wheezing and feebleness of a poor tone being taken to indicate that the tube was not duly filled. This old notion still survives in our language. A flute-player with a good tone is spoken of as being able “to fill the flute,” whilst a flautist whose tone is inferior is said to fail in filling the instrument. The expression, which is even now sometimes heard in conversation, is used by Gerock and Wolf in the prospectus of their flute, quoted at p. 86: they claim for it that it is easy to fill.

“Gentlemen,—We believe that the aspirations of the great physicist have at last been realised, and that an end has been put to all the faults pointed out by him. The flute that we have the honour of presenting to you to-day was constructed according to the procedure of M. Boehm by M. Buffet the younger, one of the most skilful makers of the capital. Professor Coche has presided at this construction, and has caused to be added to it new ameliorations of his own invention.

“Impressed with the excellence of this discovery, several of our most renowned *virtuosi* are desirous of applying it to the manufacture of the different instruments on which they are distinguished—M. Brod, for hautboys ; M. Berr, for the clarinets ; M. Gebauer, for the bassoons, &c. This concurrence of artistic approval already guarantees the value of the invention ; but that which ought, it seems to us, to more particularly deserve our encouragement and our commendation is the resolution, the tenacity displayed by M. Coche in causing this auspicious invention to bear fruit. He took the first prize for the flute at the Conservatoire ;³ his fine talent caused him to be appointed there a professor for the flute class. Well, then ! perceiving the importance of the discovery, he has had the courage to devote himself to the study of the new instrument, and to superintend its manufacture, causing notorious improvements to be made therein. And, above all, that which appears to us to be a work of the most useful kind at this conjuncture is the ‘Method’ which he has written ; it seemed to us to be drawn up in a clear style, and the rules laid down in it to be always supported by excellent examples.

“We consider, then, Gentlemen, that in granting your

³ Notwithstanding the eulogies of Berton, Coche does not seem to have come to the front as a flute-player ; indeed, compared with his great contemporaries Tulou and Dorus, he is said to have been a very indifferent performer. His wife, however, who was a pianist, was a clever artiste and a charming woman.

approval to our report you will be doing an act of justice and of utility to the art of music, as well as honourable for M. Coche.

(Signatures to the minute)

CHERUBINI.	PAER.	AUBER.
HALEVY.	CARAFÀ.	BERTON,
		<i>Reporter.</i>

“The Academy adopts the conclusions of this report.

“Certified a true copy :

QUATREMÈRE DE QUINCY,
Permanent Secretary.”

COCHE'S ATTACK ON BOEHM.

Translated from his Pamphlet, entitled 'Examen Critique de la flûte ordinaire comparée à la flûte de Bôhm,' Paris, 1838.

THE report of the Institute had come to sanction both Boehm's invention and the modifications which I had applied to it, when, just as I was about to publish the work¹ which had been the cause of this report, I learnt that Boehm's title to the invention could be disputed. As a conscientious artist, I wished to decide in accordance with precise information, and to render justice to him who had really invented the new flute. I am well aware that, as far as other considerations are concerned, it made little difference whether the flute had been

¹ *The work which had been the cause of this report; that is, Coche's pamphlet, the Examen Critique. The attack on Boehm did not form part of the pamphlet when it was presented to the six members of the Institute who were to report on Coche's flute. It was added just before its publication.*

invented by this or that artist ; but as I came forward as a propagator of the Boehm system, I was unwilling that any one should be able to raise objections to the statements made in my work. I therefore postponed its publication and wrote to M. Gordon, in Switzerland, to whom many artists attributed the invention of the flute called Boehm's. M. Gordon was not in a state to return me an answer. I received, however, a letter from his wife (see No. 1) which seems to attribute the invention of the new flute exclusively to M. Gordon (see at the end, Fig. 1).² On receiving this letter I thought it my duty to write to Boehm, and I made him understand the necessity of giving me explanations which would enable me to draw up my opinion of the case. Boehm replied (see No. 2) that the invention was really his own, and that his instrument, which was already finished in 1832, could not be compared to the attempts of M. Gordon, who was making experiments in Boehm's house in 1834.

Nevertheless, in a letter dated from Munich on the 15th of July, 1833 (see No. 3), Gordon speaks of the flute he had just had constructed by a skilful workman of Boehm. In fact, Boehm himself says that before³ this time Gordon had passed nine months at his house for the purpose of superintending the construction of his flutes. In the midst of all these assertions, I cannot do better than place before the public the evidence from which conclusions can be drawn. It is a duty I owe to myself to endeavour to ascertain the truth, let the public then decide on the validity of the claims of each of the two inventors.

² A facsimile of the drawing here referred to is given on p. 148.

³ This is a direct perversion of what Boehm *did* say to Coche. He said that Gordon spent nine months at his house, but he asserted that it was not before, but after the time here mentioned (July 1833), stating (wrongly, it may be) that Gordon came to Munich the year following (1834). See his letter to Coche, p. 130. As a matter of fact Boehm had played in public on his new flute months before Gordon entered his house. See p. 253.

A point which comes out as most evident is that in 1827 Boehm was not engaged in making flutes on the ⁴ new system, as Ivan Muller ⁵ asserts positively ; Gordon, on the other hand, had already made them. The priority of the invention is therefore secured to him ; and besides, he was the first to find the division of the column of air ; ⁶ to make use of crescents, by means of which one can obtain the effect of several movements by one finger ⁷ only ; to have recourse to the practice of making an excavation to receive the lower lip with the view of destroying the disagreeable effect of the blowing. ⁸ Such are the general principles of the construction of the new flute, which Boehm has modified, chiefly by the application of the keys for F sharp and the D shake ; by replacing by rings the crescents invented by

⁴ There is a fallacy here resulting from the misleading use of the article "the." It is true that Gordon was the first to make a flute on a new system, i.e. his own system, but not on *the* new system, i.e. Boehm's system.

If Coche had confined himself to saying that Gordon had attempted, as early as 1827, to construct a flute on a system of open keys, and that, in so doing, he had anticipated Boehm, no objection could be taken to his statement. But still Boehm does not seem to have been indebted to Gordon for the idea of this system, for he appears to have been acquainted with it before he knew him (see *infra*, p. 231).

⁵ A clarionetist, born 1781, died 1854. In 1811 he invented the thirteen-keyed clarionet.

⁶ Boehm had made a flute in which the holes had been rearranged, and so were placed according to what was believed to be the division of the column of air before he made Gordon's acquaintance (see Fig. 8). Moreover, the same thing had been done more than a quarter of a century before Gordon commenced his experiments. Coche thought that Boehm had arranged the holes of his flute according to a calculation based on the divisions of the monochord, and that Gordon was the first to adopt this method, both ideas being erroneous. See note 28, p. 202.

⁷ Boehm had obtained this effect by means of rings on his first model before he saw Gordon's crescents.

⁸ Recourse was had to the practice of making such an excavation by Dr. Ribock long before Gordon was born (p. 201).

Gordon,⁹ and by imparting much more strength and simplicity to the mechanism, which, originally composed of cranks and steel wire, provided no security for execution.

CORRESPONDENCE.

No. I.

SIR,

LAUSANNE, 20th May, 1838.

It is quite true that my husband, passionately fond of music, to which he devoted every moment he could possibly spare from his professional duties, and unable to reconcile himself to the limits and imperfections of the flute, endeavoured, during several years, to invent an instrument, in which great accuracy of intonation should be combined with a more extensive compass and easy execution. He succeeded at length in 1830—a year in which the Revolution of July deprived him of his profession, of his expectations, and consequently of his fortune. He thereupon conceived the idea, with a view of recovering it, of turning this new flute to account by playing on it in public in the principal towns of Europe, then, on taking out a patent, by establishing manufactories and introducing this beautiful instrument into the musical world.

He began by going to Munich in 1833, to be near to M. Boehm, whom he had known in Paris,¹ and one of

⁹ However much obscurity there may be regarding the origin of the ring-keys, there can be but little doubt that they were not a modification of the crescents as here maintained by Coche (pp. 41, 234). Moreover, the crescents were not invented by Gordon, but by Dr. Pottgiesser.

¹ I have no hesitation in saying that Madame Gordon is in error here. It was not in Paris, but in London that Boehm had known her husband. Boehm speaks precisely on this point (see pp. 21, 130), and I know no valid reason for calling in question the accuracy of his statement. Fétis follows Madame Gordon into this mistake.

whose workmen was the only person who could assist him in the construction of the flute which he had invented. I could not tell you at present, Sir, if M. Boehm owes to my husband the idea of the flute which he has sent you, or if he has only perfected it after his, or if, perhaps, he has sent you my husband's. I could write to obtain this information, if you would advise me, to the workman with whom he made it, and would send you his answer. But what I know is this, that after having passed some months at Munich for constructing his flute, he then went to London to carry out his plans; but as he was very shy, without introductions, without a knowledge of the world and of the way to set to work to succeed in it, he saw his pecuniary resources diminish and come to an end before he had been able to make himself known; so that he returned hither to his family ill and disheartened. Afterwards there happened an accident to fill to the brim the cup of his troubles; this instrument, which had cost him so much pains and study, became cracked in consequence of another improvement, which he wished still to make on it. Though terribly cast down, he set to work to make another of the same kind; for he had acquired by his perseverance a skill far superior to that of the workmen who surrounded him. But the earnestness which he brought to bear on the work, and the difficulty of executing it without any assistance, added to the crosses of all sorts which his designs had brought upon him, have by degrees altered his intellectual faculties, before he was able to finish his work, and he has been obliged to break it off completely, and to keep at a distance every idea which could bring it to his mind, in order to give his head the repose of which it stands in need; and it is for this reason, Sir, that I take the pen in his stead without having been able to mention to him that which forms the subject of my letter.

Perhaps M. Boehm, who must have been informed

this winter by his workman of my husband's state, may have thought that, since my husband was suffering from a mental malady, he could, without showing a want of delicacy, appropriate to himself an invention, which, without him, would remain useless to the public. What makes me suppose this is the coincidence between M. Boehm's invention and my husband's attack.² However, M. Drouet, of whom M. Gordon is an old pupil, and who has seen and admired his flute, will be able to tell you what he thinks of it, and at what period it was made. M. Tulou must also have seen it.

I add to this letter the drawing of this instrument as well as its fingering, just as my husband had drawn it out, and since Providence has permitted that you should interest yourself in this affair, and that a delicate sentiment has made you desire to be able to render justice to him to whom it belongs, be so kind, Sir, as to honour me with your advice, and tell me what proceedings I could take to maintain for my husband those rights, which if it should please God to restore him to health, may be of use to him some day. I need not say, Sir, how entitled you will be to my gratitude, and to my highest esteem.

M. GORDON.

No. 2.

MUNICH, *June 2nd*, 1838.

SIR,

I am very much obliged to you for your letter, dated the 25th of May, and I hasten to return you an answer. I know Mr. Gordon very well; he was formerly Captain

² It is, of course, unnecessary to point out that this coincidence existed only in the imagination of the writer. Had she belonged to the responsible sex, it would have been more than reprehensible on her part to place on paper such a suspicion. As it is, a double disgrace attaches to Coche, who did not shrink from publishing in a lady's name, without comment or explanation, what he well knew to be an abominable calumny.

in the Swiss Guards at Paris. I made his acquaintance in London six years ago,³ and he had at that time a flute, which was very different in its construction from other flutes, but which was out of tune, and of little practical use. He had heard that I was in London, and, knowing that I was a manufacturer, he came to call upon me, to consult me respecting flutes. At that time I had already made in London the model of my new flute, and I showed him everything that I had done.

Mr. Gordon would not adopt my flute, because it was not of his own invention,⁴ and he laboured so much to find a different construction, that his efforts almost turned his brain. In 1834 he wrote to me from Lausanne, saying that he admired very much the workmanship of my flutes, and requesting me to make one according to his ideas.⁵ I consented, and he came to Munich, where I put one of my workmen at his disposal.

According to my advice, he adopted for the most part the position of the holes of my flute, but he persisted in following out his own ideas as to the mechanism of the keys; and, after having laboured nine months with my workman, and after having constructed and tuned several flutes, he at last completed one, which resembled mine in some points. I last saw him in London in 1836. He was then in great difficulties, and he told me that he intended to give up his fruitless efforts, and play on my flute. Some time after, he wrote to me at

³ Boehm made Gordon's acquaintance in 1831, seven, not six years before the time at which he was writing.

⁴ "I asked him," said Boehm to me, speaking of Gordon, "why he did not take *my* flute, and he said, 'because I wish to have a flute of my own.'"

⁵ This letter, which was afterwards published by Boehm, was written in 1833, not 1834. There is no allusion in it to Gordon having admired the workmanship of Boehm's flutes; we may therefore conclude that Boehm did not refer to it when writing to Coche, but trusted to his memory. This may account for the inaccuracy regarding its date.

Munich to send him one of my flutes for his own use. I wrote to him, stating on what terms I would let him have one, but I received no answer; and afterwards, one of his countrymen told me that he had quite given up playing on the flute, that he had thrown his instrument into the Lake of Geneva, and was in bad health. Last year he wrote again to the workman in my employ who made his flute, wishing him to join him in establishing flute manufactories in Paris, London, Vienna, &c., and at the same time there came a letter from his family, stating that he was very ill and that they wished no answer to be sent to his letter.

I assure you, Sir, that I felt very much for Mr. Gordon, whom I esteemed on account of his character. It is unfortunate that this gentleman, who was held in high estimation as a brave officer of great talents and merit, should have lost his time and money in the vain desire to be the inventor of an instrument for which neither his knowledge of acoustics nor his skill in mechanics was sufficient, and that he should have incurred so much expense and experienced so much anxiety that it affected his mind as well as his worldly affairs. If you wish to have certificates that my flute was completed in 1832, and that Mr. Gordon was having his flutes made in my manufactory in 1834, I will send them to you immediately. In 1834, there was an article respecting my new flute in the 'Gazette Musicale de Leipsig,' No. 5. In 1833, MM. Farrene, Camus, and Laurent, manufacturers of flutes (Palais Royal) who knew Mr. Gordon, were already acquainted with my new flute,⁶ and the reason that it was not then more

⁶ Coche excused himself for making assertions calculated to ruin Boehm's character as an honourable man by stating that he was actuated by justice, conscientiousness, and the duty he owed to himself of ascertaining the truth; but these motives do not seem to have been strong enough to induce him to write to Boehm for the certificates he offered to produce that Gordon was having flutes made in his manufactory in 1834, nor does he appear to have taken

generally known, was, that I was too much occupied during three years with ironworks in England, and also I played very little myself. But I shall now publish a history of my flute in the musical and political journals. At the same time accept, Sir, my friendly salutations,⁷ &c., &c.

THEOBALD BOEHM,

*First Flute of the Chapel Royal at Munich,
and instrument maker.*

No. 3.

MUNICH, 15th July, 1833.

SIR,—Having long known how obliging you are, I make bold to ask you to do me a service. It relates to the delivery to the undermentioned of some copies of the papers, which I direct to you from Munich, where I have just had made by a skilful workman an excellent instrument on my model. I shall start shortly for London, where my address is 22 *Newcastel* (sic) *Street*,

the trouble to inquire if Messrs. Farrene, Camus, and Laurent, of the Palais Royal, could confirm or contradict Boehm's statement that they were acquainted with his flute in 1833. Boehm, as already mentioned (p. 49), had spent some days in Paris on his way home from London in that year.

⁷ It will be observed that, although Boehm does not assign any share of the invention to Gordon, but speaks disparagingly of his knowledge of mechanics and his scientific attainments, and seeks to convey the impression that his flute, with the exception of the keys, was founded on his own (compare p. 93), yet this letter contains no passage in which Boehm denies categorically that he derived any ideas from Gordon, and I know of no such denial in any part of his works. However, in a private letter dated May 20th, 1878, published in *Musical Opinion* of March 1st, 1890, in forwarding a copy of his pamphlet of 1847, he wrote: "You will find in the pages 5, 7, 8, 9, 10 and 11, marked with red ink, that I never had used anything of M. Gordon, but that he had to thank me for what I had done for him."

Strand. Be so good as to send me a line thither on receiving the papers, which I have prepaid as far as I could. We will settle, later on, for what you have to pay. You might leave your address with some of those mentioned below, so that, if any amateurs should appear, you would be able to let them have mine in London.

For M. Pleyel, at the Music Warehouse, Boulevard des Italiens, 6 copies; for Paccini, idem, No. 11; M. Frey, No. 8 Place des Victoires; Schlesinger, No. 97 Rue Richelieu; M. Laurent, Flute Maker, 65 Palais Royal; M. Tulou, No. 27 Rue des Martirs; M. Drouet, No. 28 Rue de l'Arcade; M. Farrene, No. 21 Rue S. Marc; M. Camus, Rue Montmartre, opposite the Rue Montorgueil; M. Lemoine, No. 9 Rue de l'Echelle; Jeannet et Cotelle, 123 Rue St. Honoré; at the office of M. Fétis, editor of the 'Journal of Fine Arts,' No. 31 Rue S. Lazare.

With thanks, which pray accept in advance, and with my kind regards, and to your family as well,

Your faithful servant,

GORDON.

This letter is addressed to M. Mercier, 2 Rue St. Nicaise.

THE following is the original French of the letters and other documents of which a translation has been given.

NO. 1.

PARIS, le 6 novembre, 1837.

MON CHER MONSIEUR,

Je ne puis vous exprimer toute l'admiration que j'éprouve chaque jour en travaillant votre magnifique et riche instrument, qui est appelé à faire une révolution

des plus remarquables dans les instruments à vent. Aussi c'est avec beaucoup d'ardeur que je le cultive ; puissai-je un jour être digne par mon exécution de partager les suffrages qui appartiennent de droit à cette belle invention.

Je doit vous prévenir, mon cher Monsieur, qu'un facteur d'instruments du nom de Clair Godefroy aîné vient de copier exactement votre instrument, et de plus y a mis son nom comme s'il en était l'inventeur ; je crois donc qu'il serait de votre intérêt de venir à Paris pour prendre un brevet d'invention et d'importation, et alors vous seriez le seul facteur pouvant confectionner.

J'ignore tout à fait quelles sont vos intentions à ce sujet ; peut être cela vous est-il égal que l'on fasse des contrefaçons, mais dans le doute j'ai mis toute la discrétion possible pour que cela n'arrive pas ; ainsi vous pouvez juger de mon étonnement quand j'ai vu votre instrument copié et exposé dans un passage de la capitale.

Je vous prie donc de garder cette lettre Secrète, de me dire à quels artistes, et à quelles personnes vous avez envoyé votre flûte, et quelles sont vos intentions au sujet de la contrefaçon.

Je l'ai fait entendre aux membres de l'institut, Mrs. Cherubini, Paër, Auber, Berton, Halévy ; je crois avoir entre les mains la possibilité de faire adopter votre instrument, et si des arrangemens particuliers peuvent vous être agréables, en supposant que vous ayez l'intention de faire un dépôt à Paris, nous pourrions nous entendre à ce sujet.

Croyez à l'admiration de votre dévoué,

V. COCHE.

N'oubliez pas, je vous prie, la musique de votre composition que vous m'avez promise.

Passage violet No. 1.—Coché.

NO. 2.

PARIS, le 19 avril, 1838.

MON CHER MONSIEUR,

J'ai eu le bonheur de placer les deux dernières flûtes que vous m'avez envoyées ; malheureusement pour moi, ce sont des artistes qui en ont fait l'acquisition, mais au moins, j'en suis content pour vous. La flûte envoyée pour Mr. Guibal d'épernon, se trouve de cette manière vendue à une autre personne, mais, il n'est pas venu la chercher, et il a bien fait peur, car je connais trop cet homme-là pour ne pas m'en féliciter : cette flûte avait deux têtes, mais j'ai été obligé d'en donner une à un amateur de Bordeaux dont la flûte était fendue complètement. Tirez une *Traite à cinq jours de vue sur moi de cinq cent quarante francs* (540 fr.). Ou, si vous devez venir ici, vous y trouverez cet argent—faites comme vous voudrez—j'ai encore eu beaucoup de contrariétés, malgré toutes mes courses, et malgré toutes vos lettres que j'ai postées moi-même, les intrigues ont réussi. Mr. Coche a présenté une flûte perfectionnée, il l'a jouée à l'Institut, et dans un rapport, il a été *qu'avant la découverte de Mr. Coche* les flûtes étaient vicieuses, mais que grâce à sa *découverte*, etc. etc.—il a fait mettre cela dans tous les journeaux, et vous et moi sommes mis à l'écart.

Sa *découverte* consiste, je crois, à faire fermer la clef du 4^e doigt, ainsi que celle du pouce :

Godfroy aussi a mis un ou deux articles aux journeaux et j'ai eu soin qu'il parle de vous, et qu'il rétablisse ce qui vous revient, mais pour l'Institut, le mal est fait—je souhaite bien que vous puissiez venir ici, mais je ne vous y engage pas, car pour vos intérêts ils n'y gagneraient en rien—cependant, si vous allez cette année en Angleterre, il faut tâcher de rester un peu à Paris, pour faire parler un peu les journeaux et tâcher de démentir les menteurs et les intrigants.

Adieu mon cher Mr. Boehm, si vous ne venez pas, donnez-nous de vos nouvelles.

No. 3.

PARIS, le 25 mai, 1838.

MONSIEUR,

Si je n'ai pas répondu à votre lettre c'est que je voulais attendre le résultat de la séance de l'institut où l'on devait juger votre flûte. Cette séance successivement ajournée a reculé de près de trois mois l'époque à laquelle votre flûte et mon travail furent jugés, mais, déjà vous avez donné pouvoir à Mr. Camus de faire valoir votre invention, vous vous étiez en quelque sorte retiré derrière lui, et quant à moi, je n'avais plus qu'à produire le rapport de l'institut et à jouer la flûte, enrichie de mes perfectionnemens, afin que le public pût juger entre Mr. Camus et moi ; une réponse eût été sans but : c'est entre artistes que la question doit se vider.

Aujourd'hui, Monsieur, il s'élève une petite difficulté, peu importante au fond pour les flûtistes qui joueront votre instrument, mais qui intéresse à un haut degré l'inventeur. On dit dans le monde artistique que la flûte qui porte votre nom a été découverte et inventée avec tous ses perfectionnemens actuels par un nommé *Gordon*, ancien élève de Drouet ; que ce Gordon ayant employé plusieurs années d'essais et de travaux, a renoncé pour cause de maladie à s'occuper de la flûte, et que votre découverte, en un mot, n'est autre que la sienne ; moi, Monsieur, qui ais correspondu avec vous, je me suis récrié contre une telle assertion, parceque vos lettres ne contiennent rien qui me le prouvent ; mais dans cette conjoncture c'est l'amour-propre de l'inventeur qui est en jeu, et je crois vous rendre service en vous écrivant pour vous prier de me mettre en position de répondre à toutes les clabauderies par un démenti formel, je vous le répète, Monsieur, il m'importe fort peu que la nouvelle flûte soit de Gordon, ou de vous, le public ne l'adoptera pas moins vite, qu'elle porte votre nom ou un autre ; mais il est de votre intérêt de détruire toutes les

suppositions et c'est pourquoi je vous écris. Tout autre peut-être se soucierait fort peu de ce conflit au sujet de l'invention et chercherait à se substituer à la place de l'un ou de l'autre inventeur, ou de tous les deux ensemble ; mais, Monsieur, j'agis plus franchement et je vous avertis de ce qui se passe. J'attends donc votre réponse : jusqu'au 15 juin courant je m'en servirai pour fermer la bouche aux médisants, et vous faire rendre justice. Quelle que soit d'ailleurs la vérité, ne me faites point attendre votre lettre, car je pense bien que vous ne me mettez point par votre silence, dans la position de supposer que votre invention a une autre origine que celle avouée par vous. Comme vous êtes le seul intéressé dans la question, veuillez m'écrire le plutôt possible et croire à la haute considération de votre tout dévoué serviteur

V. COCHE.

REPORT OF THE ACADÉMIE ROYALE DES BEAUX-ARTS ON COCHE'S FLUTE.

*Letter from M. Berton, the writer of the Report, to
M. Coche.*

MONSIEUR,

Je vous fais parvenir la copie de mon rapport à l'Institut, et je pense que vous ferez une chose utile en publiant l'opinion des signataires de ce rapport sur l'importance de votre travail ; non seulement vous avez bien mérité de vos confrères en consacrant vos soins et vos veilles à l'étude et à la construction du nouvel instrument, mais les compositeurs vous sauront un gré infini d'avoir rendu plus facile l'usage de cette flûte sans être désormais arrêtés par des obstacles jadis insurmontables. Maintenant on pourra employer sans crainte et indifféremment la flûte sur tel ou tel degré d'échelle chromatique, parce qu'on trouve toujours égalité de son,

intonation parfaite dans tous les tons, perfectionnement du mécanisme qui ne fait plus que le bruit ordinaire des autres instrumens à vent, possibilité d'exécuter la musique de votre illustre maître Tulou, et tous les trilles sur tous les degrés de votre instrument : ces avantages étaient plus que suffisans pour motiver l'adhésion de l'Académie au rapport dont vous pouvez vous honorer.

Je suis avec considération,

H. BERTON.

INSTITUT DE FRANCE.

ACADÉMIE ROYALE DES BEAUX-ARTS.

Le Secrétaire perpétuel de l'Académie certifie que ce qui suit est extrait du Procès-verbal de la Séance du Samedi, 24 Mars 1838.

MESSIEURS,

D'après l'invitation qui vous a été faite par M. le Ministre de l'intérieur, vous avez renvoyé à votre section de Musique l'examen des perfectionnemens apportés dans la confection des Flûtes, dites *Flûtes selon le système de Bohm*, par M. COCHE, professeur de flûte à notre Conservatoire de Musique, et auteur d'une Méthode ayant pour but de faciliter l'enseignement et l'étude de ce nouvel instrument. Nous nous sommes occupés de cet examen, et je vais avoir l'honneur de vous donner lecture du rapport dans lequel votre section de musique a consigné son opinion sur les mérites de cette flûte et ceux de la méthode composée par M. Coche.

L'instrument de musique auquel on a donné le nom de flûte est sans contredit, l'un des instrumens le plus anciennement créés, et, depuis la flûte de Pan jusqu'à celles en usage maintenant, et que l'on nomme *flûtes traversières*, par la raison qu'on les joue en *travers*, la forme et les moyens d'exécution sur cet instrument ont

continuellement éprouvé de grands changemens, et l'on ne peut douter que ces divers changemens n'aient toujours eu pour but celui de chercher à corriger les vices d'intonation inhérens à la construction des anciennes flûtes. Nous pensons que l'inventeur de cette nouvelle facture a atteint ce but ; et nous allons vous donner connaissance des moyens qu'il a su employer pour y parvenir.

Les personnes éclairées, savantes ou artistes, ont toujours pensé qu'il serait presque impossible de parvenir à construire une flûte qui d'après les lois de l'acoustique, fût reconnue parfaitement juste dans toute l'étendue de son diapason, et que souvent elle ne nous paraissait l'être que par l'habileté du virtuose exécutant, et ils appuyaient cette assertion des raisons suivantes. L'un d'eux, le célèbre Charles, votre illustre confrère à l'Académie des sciences, grand amateur de musique et jouant assez bien de la flûte, nous disait, en causant avec nous, qu'il avait grand regret d'avoir étudié cet instrument plutôt que le violon, instrument sur lequel on peut parvenir à jouer rigoureusement juste, au lieu que sur la flûte cela lui paraissait impossible, par la raison que sa construction était vicieuse en plusieurs points. 1°. Que l'embouchure offrait une grande difficulté à vaincre, celle de l'insufflation, car pour introduire la colonne d'air dans le tube, on ne peut éviter d'en perdre une partie qui passe à l'extérieur, et que par ce fait, inévitablement on détruisait une portion de l'intensité du son et les moyens de la maîtriser avec sûreté ; 2°. que la perce des trous était mathématiquement et acoustiquement parlant, vicieuse, car le placement des trous n'y a été calculé que sur l'extension possible des doigts de l'homme, et non d'après les lois immuables de la physique ; 3°. que dans toute l'étendue de son diapason, il y avait beaucoup de sons vagues, surtout ceux que l'on veut faire entendre dans la partie grave de l'instrument, et que ceux de l'aigu l'étaient souvent par trop ; enfin que tous les sons des divers registres de la flûte ne semblaient pas tous être de la même famille ;

4°. qu'il y avait impossibilité de faire sur telle ou telle note des trilles, improprement appelés cadences ; et qu'en définitive, malgré la légèreté, la douceur de ses sons, la flûte resterait un instrument imparfait jusqu'au moment où un homme ingénieux trouverait les moyens de corriger tous ces défauts, et des artistes habiles et assez courageux pour abandonner leurs vieilles habitudes et mettre en lumière les inventions nouvelles et utiles dans la culture des beaux-arts.

MESSIEURS :

Nous croyons que les vœux du grand physicien sont enfin exaucés et que tous les vices signalés par lui sont détruits. La flûte que nous avons l'honneur de vous présenter aujourd'hui fut construite d'après les procédés de M. Bóhm par M. Buffet jeune, l'un des plus habiles facteurs de la capitale ; le professeur Coche a présidé à cette construction et y a fait ajouter de nouvelles améliorations de son invention.

Pénétrés de l'excellence de cette découverte, plusieurs de nos virtuoses les plus renommés veulent en faire l'application à la facture des divers instrumens sur lesquels ils se sont illustrés, M. Brod, pour les hautbois ; M. Berr, pour les clarinettes ; M. Gebauer, pour les bassons, etc. Ce concours d'approbations artistiques est déjà une sûreté des mérites de l'invention ; mais ce qui nous semble devoir plus particulièrement mériter nos encouragemens et nos éloges, c'est la constance, la ténacité que M. Coche a mises à faire fructifier cette heureuse invention. Il a remporté le premier prix de flûte au Conservatoire ; son beau talent l'y fit nommer professeur dans la classe de flûte. Eh bien ! sentant l'importance de la découverte, il a eu le courage de se livrer à l'étude du nouvel instrument, d'en surveiller la fabrication en y faisant faire de notoires perfectionnemens, et surtout ce qui nous paraît être un travail des plus utiles en cette circonstance, c'est la Méthode qu'il a composée ; elle

nous a paru être rédigée avec clarté et les préceptes y être toujours appuyés par d'excellens exemples.

Nous pensons donc, Messieurs, qu'en accordant votre approbation à notre rapport, vous ferez une chose juste et utile à l'art musical autant qu'honorable pour M. Coche.

Signé à la minute :

CHERUBINI.	PAER.	AUBER.
HALEVY.	CARAFÀ.	BERTON, rapporteur.

L'Académie adopte les conclusions de ce rapport.

Certifié conforme :

Le Secrétaire perpétuel,

QUATREMÈRE DE QUINCY.

COCHE'S ATTACK ON BOEHM.

Le rapport de l'Institut était venu sanctionner et l'invention de Bôhm et les modifications que j'y avais apportées, lorsqu'au moment de publier le travail qui avait motivé ce rapport, j'appris que la qualité d'inventeur pouvait être contestée à Bôhm. En artiste consciencieux, je voulais fixer mon opinion d'après des renseignemens exacts et rendre justice à celui qui avait véritablement découvert la nouvelle flûte. Je sais bien qu'il importait fort peu d'ailleurs que la flûte eût été inventée par tel ou tel artiste ; mais moi, qui me donnais comme propagateur du système de Bôhm, je ne voulais point qu'on pût réclamer contre les assertions contenues dans mon travail ; j'ajournai donc la publication et j'écrivis à M. Gordon en Suisse, auquel l'opinion de plusieurs artistes attribuait l'invention de la flûte dite de Bôhm. M. Gordon étant hors d'état de me répondre, je reçus néanmoins de sa femme une lettre (*Voir N. 1*) qui

semble attribuer exclusivement à M. Gordon¹ l'invention de la flûte nouvelle. À la réception de cette lettre, je crus devoir écrire à Böhlm, et je lui fis comprendre la nécessité de me donner les éclaircissemens d'après lesquels je pusse formuler mon opinion. Böhlm me répondit (V. N. 2) que l'invention était véritablement de lui, et qu'en 1832 son instrument déjà complet ne pouvait être comparé aux essais de M. Gordon qui en 1834 faisait fabriquer chez lui Böhlm. Cependant, par une lettre datée de Munich du 15 juillet 1833 (V. N. 3), Gordon parlait de la flûte qu'il venait de faire construire par un habile ouvrier de Böhlm. En effet, Böhlm dit lui-même qu'avant cette époque Gordon avait passé neuf mois chez lui pour surveiller la construction de ses flûtes. Au milieu de toutes ces assertions, je ne puis mieux faire que de mettre sous les yeux du public les pièces de conviction, au moyen desquelles il pourra tirer des conséquences. Je me devais à moi-même de chercher la vérité ; qu'on juge donc la validité des prétentions de l'un ou de l'autre inventeur.

Ce qui ressort de plus évident, c'est qu'en 1827 Böhlm ne s'occupait pas de la fabrication des flûtes d'après le nouveau système, Iwan Müller l'affirme positivement ; Gordon, au contraire, en avait déjà construit ; l'antériorité de l'invention lui est donc acquise ; et d'ailleurs, il fut le premier à trouver la division de la colonne d'air ; à faire usage de croissans, au moyen desquels on peut obtenir le résultat de plusieurs mouvemens par un seul doigt ; à pratiquer une excavation pour recevoir la lèvre inférieure dans le but de détruire l'effet désagréable produit par le souffle. Telles sont les bases générales de la construction de la nouvelle flûte que Böhlm a modifiée, notamment par l'application des clés de *fa* dièse et du trille de *ré* en remplaçant par des anneaux les croissans inventés par Gordon, et en donnant beaucoup plus de solidité et de simplicité au mécanisme

¹ Voir à la fin, Fig. 1.

qui, dans le principe, se composait de crochets et de fil d'acier qui n'offraient point de sécurité pour l'exécution.

No. 1.

MONSIEUR,

LAUSANNE, *le 20 mai*, 1838.

Il est très-vrai que mon mari, passionné de la musique, à laquelle il a consacré tous les momens que son état ne réclamait pas impérieusement, et ne pouvant prendre son parti des bornes et de l'imperfection de la flûte, a cherché, pendant plusieurs années, à en inventer une qui réunit à une grande justesse de son une plus grande étendue et une exécution facile. Il y réussit enfin en 1830, époque à laquelle la révolution de juillet l'a privé de sa vocation, de ses espérances, et par conséquent de sa fortune. Il eut alors l'idée de tirer parti de cette nouvelle flûte, pour la rétablir, en se faisant entendre dans les principales villes de l'Europe, puis en obtenant un brevet d'invention, établissant des fabriques et introduisant ce bel instrument dans le monde musical.

Il commença par aller à Munich en 1833, auprès de M. Bôhm, qu'il avait connu à Paris, et dont un des ouvriers pouvait seul l'aider à la confection de la flûte qu'il avait inventée. Je ne pourrais vous dire à présent, Monsieur, si c'est à mon mari que M. Bôhm doit l'idée de la flûte qu'il vous a envoyée, ou s'il l'a seulement perfectionnée d'après la sienne, ou si, peut-être, il vous a envoyé celle de mon mari; je pourrais écrire pour le savoir, si vous me le conseillez, à l'ouvrier avec lequel il l'a faite, et je vous enverrais sa réponse. Mais ce que je sais, c'est qu'après avoir passé quelques mois à Munich pour la facture de sa flûte, il est allé ensuite à Londres pour l'accomplissement de ses projets; mais comme il était fort timide, sans recommandation, sans connaissance du monde et de la manière de s'y prendre pour y réussir, il y a vu diminuer et finir ses ressources pécuniaires avant

d'avoir pu se faire connaître ; en sorte qu'il est revenue ici, dans sa famille, malade et découragé. Puis un accident est venu compléter tous les chagrins qu'il avait essuyés : cet instrument, qui lui avait coûté tant de peines et de veilles, s'est fendu par suite d'un perfectionnement qu'il a voulu encore y faire. Quoique désolé, il s'est remis à l'ouvrage pour en faire un autre ; car il avait acquis par sa persévérance une habileté bien supérieure aux ouvriers qui l'entouraient. Mais l'ardeur qu'il a mise à ce travail, et la difficulté de l'exécuter sans aucun secours, jointes aux contradictions de tout genre que ses projets lui avaient suscitées, ont peu à peu altéré ses facultés intellectuelles avant qu'il ait pu achever son ouvrage, et il a dû l'interrompre entièrement et éloigner toute idée qui pût s'y rapporter, afin de laisser reprendre à sa tête le calme dont elle a besoin ; et c'est ce qui fait, Monsieur, que je prends la plume à sa place, sans avoir pu lui parler de ce qui fait le sujet de ma lettre.

Peut-être M. Bôhm, qui doit avoir appris cet hiver par son ouvrier l'état de mon mari, aura-t-il cru que, puisque mon mari était atteint d'une maladie mentale, il pouvait, sans manquer à la délicatesse, s'approprier une invention qui, sans lui, restait inutile au public. Ce qui me le ferait supposer, c'est la coïncidence de l'invention de M. Bôhm avec la maladie de mon mari. Du reste, M. Drouet, dont M. Gordon est un ancien élève, et qui a vu et admiré sa flûte, pourra vous dire ce qu'il en pense, et à quelle époque elle a été faite. M. Tulou doit l'avoir vue aussi.

Je joins à cette lettre le dessin de cet instrument ainsi que sa tablature, telle que mon mari l'avait confectionnée ; et puisque la Providence a permis que vous vous intéressiez à cette affaire, et qu'un sentiment délicat vous a fait désirer de pouvoir faire rendre justice à celui à qui elle appartient, veuillez m'honorer de vos conseils, Monsieur, et me dire quelles démarches je pourrais avoir à faire pour conserver à mon mari des droits qui, si Dieu

permet sa guérison, pourraient lui être utiles un jour. Je n'ai pas besoin de vous dire, Monsieur, tous les titres que vous acquerez à ma reconnaissance, ainsi que toute ma considération.

M. GORDON.

No. 2.

MONSIEUR,

MUNICH, le 2 juin, 1838.

Je vous suis bien obligé pour votre lettre du 25 mai, et je m'empresse de vous donner de suite une réponse. Je connais très-bien M. Gordon, ci-devant capitaine dans la garde suisse à Paris. Je fis sa connaissance à Londres il y a six ans, et il avait dans ce tems une flûte d'une construction différente des autres flûtes, mais qui était fausse et peu praticable. Il avait pris connaissance de mon séjour à Londres, et vint me visiter pour me consulter sur des flûtes, parce qu'il savait que j'en fabriquais moi-même. Dans ce tems, j'avais déjà fait à Londres le modèle de ma flûte nouvelle, et je lui montrai tout ce que j'avais fait.

M. Gordon ne voulut pas prendre ma flûte parce qu'elle n'était pas de *son* invention, et il travailla tant pour trouver une construction différente, que ses efforts lui tournèrent presque la tête. En 1834, il m'écrivit de Lausanne qu'il admirait beaucoup l'ouvrage de mes flûtes, et me demanda si je ne voudrais pas lui faire une flûte d'après ses idées ; je consentis, et il vint à Munich, où je mis un de mes ouvriers à sa disposition.

D'après mon conseil, il adopta, pour la plus grande partie, la position des trous de ma flûte ; mais il voulait absolument suivre ses idées quant au mécanisme des clés, et après avoir travaillé pendant neuf mois avec mon ouvrier ; après avoir construit et réglé plusieurs flûtes, à la fin il en eut une qui ressemblait en quelques parties à la mienne. Je le vis pour la dernière fois à Londres en 1836, très-embarrassé, ou il me dit qu'il voulait abandonner ses occupations inutiles et jouer de ma flûte.

Quelque tems après, il m'écrivit à Munich de lui envoyer une de mes flûtes pour s'en servir. Je lui écrivis mes conditions, sur quoi je ne reçus plus de lettres de lui ; et plus tard, un de ses compatriotes me dit qu'il avait renoncé entièrement à jouer de la flûte ; qu'il avait jeté son instrument dans le lac de Genève, qu'il était malade. L'année passée, il écrivit encore une fois à mon ouvrier qui avait fait sa flûte, pour l'engager à s'associer avec lui pour établir des fabriques de flûtes à Paris, à Londres, Vienne, etc., et en même tems il arriva une lettre de sa famille, l'informant qu'il était bien malade, et témoignant le désir qu'on ne lui fit point de réponse.

Je vous assure, Monsieur, que j'eus beaucoup de compassion pour M. Gordon, que j'estimais à cause de son caractère, et il est bien dommage que cet homme, qui était estimé de beaucoup comme un brave officier, possédant de grands talens et de beaucoup de mérite, ait perdu son tems et son argent en ayant la folie de vouloir être l'inventeur d'une chose pour laquelle ni sa connaissance dans l'acoustique ni son habileté dans le mécanisme n'étaient suffisantes, et qui lui donnait tant de peine que les efforts dérangèrent sa tête et sa fortune. Si vous désirez avoir des certificats que ma flûte était déjà complète en 1832 et que M. Gordon faisait faire ses flûtes dans mon établissement à Munich en 1834, je vous les ferai parvenir tout de suite. En 1834, il y avait un article concernant ma nouvelle flûte dans la 'Gazette Musicale de Leipzig,' No. 5. En 1833, MM. Farrene, Camus et Laurent, facteurs de flûtes (Palais-Royal), qui connaissent M. Gordon, connaissaient déjà ma nouvelle flûte, et la cause qu'elle n'était pas encore connue plus généralement, était parce que j'étais trop occupé pendant trois ans avec les fabrications de fer en Angleterre, et que je jouais très-peu moi-même ; mais à présent je ferai mettre dans les gazettes musicales et dans les journaux politiques une histoire détaillée de ma flûte.

En même tems recevez, Monsieur, mes salutations amicales et ma plus haute considération.

THEOBALD BOEHM.

No. 3.

MONSIEUR,

MUNICH, 15 juillet, 1833.

Connaissant depuis long-tems votre obligeance, je ne crains pas de vous demander un service. Il s'agit de faire remettre aux ci-après nommés quelques exemplaires des imprimés que je vous adresse de Munich, où je viens de faire exécuter par un habile ouvrier un instrument excellent d'après mon modèle. Je partirai prochainement pour Londres, où mon adresse est *New-Castel street Strand 22*. Veuillez m'y adresser un mot sur la réception des imprimés, que j'affranchis aussi loin que je puis. Nous compterons plus tard vos déboursés. Vous pourriez laisser votre adresse chez quelques-uns des ci-dessous nommés pour que, s'il se présente des amateurs, vous puissiez leur indiquer la mienne à Londres.

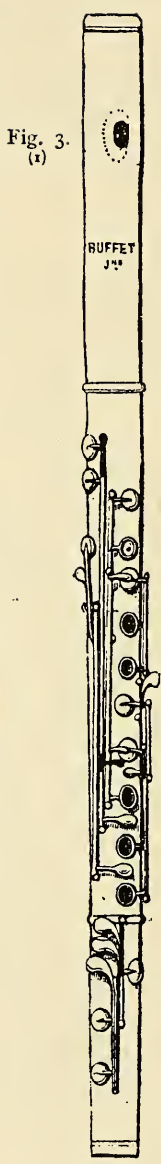
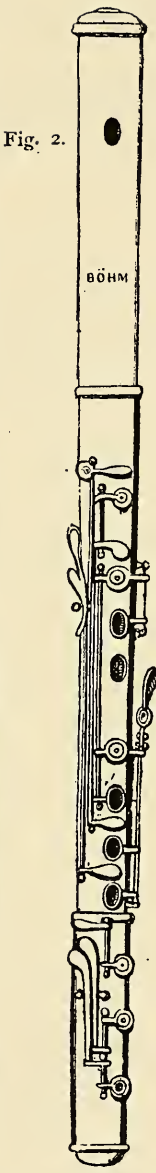
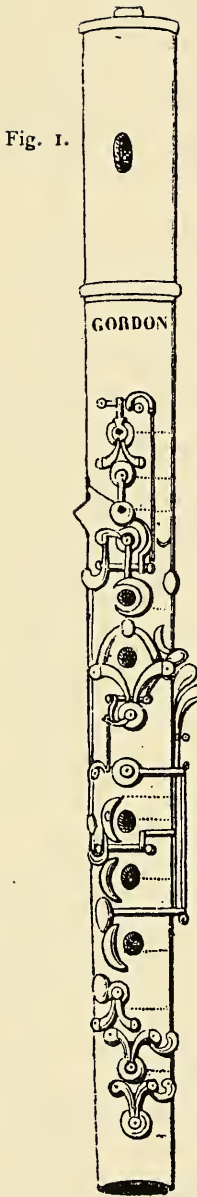
Pour M. Pleyel, au magasin de musique, boulevard des Italiens, 6 exemplaires ; pour Paccini, idem, No. 11 ; M. Frey, place des Victoires, No. 8 ; Schlesinger, rue Richelieu, No. 97 ; M. Laurent, facteur de flûtes, Palais-Royal, 65 ; M. Tulou, rue des Martirs, No. 27 ; M. Drouet, rue de l'Arcade, No. 28 ; M. Farrene, rue S.-Marc, No. 21 ; M. Camus, rue Montmartre, en face la rue Montorgueil ; M. Lemoine, rue de l'Echelle, No. 9 ; Jeannet et Cotelle, rue S.-Honoré, No. 123 ; au bureau de M. Fétis, rédacteur du journal des Beaux-Arts, rue S.-Lazare, No. 31.

Recevez d'avance mes remercimens et mes complimens très-affectueux, ainsi que votre famille.

Votre dévoué serviteur,

GORDON.

Cette lettre est adressée à M. Mercier, rue St. Nicaise, No. 2.



(1) Malgré les améliorations apportées à cet instrument, le prix en est moins élevé que celui de la Flûte ordinaire à patte d'*m.*

FIG. 13.—COPY OF THE ENGRAVING IN COCHE'S PAMPHLET.

EXTRACTS FROM BOEHM'S PAMPHLET,

"De la Fabrication et des derniers Perfectionnements des Flûtes."

DANS cette dernière ville, j'avais été frappé du volume de son de Nicholson, alors dans toute la vigueur de son talent. Cette qualité résultait de la largeur extraordinaire des trous de sa flûte, mais il fallait son habileté merveilleuse et son excellent embouchure pour masquer le défaut de justesse et l'inégalité de son, résultant d'une disposition de trous incorrecte et condamnée par les principes élémentaires de l'acoustique. Je vis aussi à Londres, à cette époque, un amateur, M. Gordon, qui avait déjà fait de nombreux essais de perfectionnement, d'abord à Paris, puis à Londres.

Le trou de *mi* de sa flûte était percé plus bas et plus large que d'usage, et pour éviter le levier du *fa*, il avait adopté une clef à anneau ; il avait en outre fait faire une quantité de clefs et de leviers ingénieusement imaginés, mais trop compliqués pour offrir jamais un grand avantage à sa flûte, construite du reste en dehors des bases de l'acoustique ; et destinée, par conséquent, demeurer imparfaite. Tout cela me confirma dans cette conviction, fruit de mes longues recherches, qu'on n'obtiendrait aucun perfectionnement complet sans réformer le système de doigter.

Je résolus donc de consacrer mes veilles à la construction d'une flûte entièrement nouvelle, qui réunît la justesse, l'égalité et la puissance de son, et sur laquelle toute musique, écrite dans son étendue, pût s'exécuter. De retour à Munich, je me mis à l'œuvre. Après un mûr examen et de nombreuses expériences de perces et de mécanismes, je me fixai au système des clefs à anneaux comme répondant le mieux à toutes les exigences, système que j'avais déjà médité dès avant 1831.

Malgré ce succès, dont je me réjouis, je confesse que je n'ai jamais fait grand cas de mon invention, ni sous le rapport du mérite, ni sous le rapport du produit. Je me contentais de l'approbation de quelques connaisseurs impartiaux ; je n'avais pas même songé à prendre de brevet ; mais je sais qu'on a cherché à me contester ma découverte, pour en parer un homme aussi honnête que modeste, et qui ne peut plus protester . . . , car il est mort. Je crois donc devoir donner quelques explications sur mes rapports avec M. Gordon.

Dès 1832, ma nouvelle flûte était achevée ; je l'avais fait entendre maintes fois, j'en avais livré au public une grande quantité, quand je reçus de M. Gordon la lettre suivante, dont l'original est entre mes mains :—

“ LAUSANNE, 15 février, 1833.

“ MON CHER MONSIEUR,

“ Je suis depuis quinze jours de retour chez moi, à Lausanne, après un séjour assez long à Paris, où je suis venu de Londres peu après vous y avoir vu, lorsque vous en êtes partis pour Munich. Je n'ai pas perdu mon temps, et j'ai travaillé avec persévérance à une flûte nouvelle que j'ai faite moi-même aussi bien que j'ai pu et que je viens de terminer.

“ Je ne vous ai point oublié, et j'ai toujours attendu que vous m'enverriez une flûte perfectionnée que vous vous proposiez de chercher à faire à votre retour en Allemagne. Selon votre offre à Londres, je veux vous envoyer ma flûte, en vous priant de m'en faire une belle sur ce modèle, vu que je possède entièrement le doigter pour la jouer ; je vous enverrai en même temps la tablature pour le doigter.

“ Je n'ai pas voulu vous envoyer ma flûte avant d'avoir reçu de vos nouvelles. Veuillez donc m'écrire à l'adresse ci-après :

À M. Gordon, à Lausanne, Suisse,

et me dire la manière que vous croyez la plus sûre de

vous la faire parvenir sans accident, et si vous pourriez m'en faire une semblable et vous en occuper le plus tôt possible. Dans l'espérance que ma lettre vous trouvera à Munich, je vous l'envoie à l'adresse que vous m'aviez donnée.

" Acceptez l'assurance, etc.,

" GORDON."

Sur ma réponse, M. Gordon vint quelques mois après à Munich, et il reconnut les imperfections de son instrument. Il rejeta donc complètement son système pour en essayer un nouveau. Ce qu'il cherchait, c'était un mécanisme simplifié qui lui permit de conserver plusieurs des doigts ordinaires.

J'avais mis à sa disposition mes ateliers et mes ouvriers, et c'est au bout d'une année, après avoir entièrement gâté deux flûtes par ses essais de modifications continuelles, qu'il termina la flûte représentée par la figure 1,² avec laquelle il quitta encore Munich.

Il appelait sa flûte, bien à tort, flûte *diatonique*, car il n'y a que l'ancienne flûte à 6 trous qui soit telle. Toutes celles faites depuis, et pourvues de clefs, sont chromatiques.

Il fit faire, pour le doigter de sa flûte, une lithographie qu'il publia en 1834.

Dans cette tablature, que je reçus de lui-même, il dit, entre autres choses relatives à la description de sa flûte :

" La suppression des deux clefs de *fa* naturel, et leur remplacement par une clef de *fa* dièse est une idée dont l'application offre de grands avantages. L'idée de cette clef de *fa* dièse, *communiquée* par *M. Th. Boehm, de Munich*, a été, *avec son agrément*, adoptée pour la *présente flûte* dont elle complète les moyens d'exécution."

Du reste, personne, que je sache, n'a ni imité ni joué la flûte de Gordon. Plus tard, quand je le rencontrai à Londres, il me manifesta le désir d'avoir une de mes flûtes, la sienne ne le contentant nullement.

² See Fig. 9 of this work (p. 90).

J'ai entre mes mains la preuve de ces faits. Comment donc, ma flûte, antérieure à celle de Gordon, pourrait-elle lui avoir emprunté quelque chose, ainsi qu'on l'a prétendu ?

M. Gordon a fait usage des parties essentielles de mon instrument pour construire le sien ; mais il l'a toujours loyalement reconnu.

La preuve la moins douteuse de l'authenticité de mon invention résultera de l'exposé des motifs et de l'explication des principes d'acoustique et de mécanique par moi mis en usage, car celui-là seul est capable d'une œuvre rationnelle qui peut rendre compte du pourquoi et du comment dans l'exécution de chaque détail.

OBITUARY ARTICLE ON BOEHM.

From the London 'Figaro' of December 28th, 1881.

I RECENTLY announced the death, at his birthplace, Munich, at the advanced age of 88, of Theobald Boehm, celebrated as the alleged inventor of the Boehm method of fingering for the flute. This gentleman must not be confounded with Joseph Boehm, once a celebrated violinist, who died in 1876. Joseph Boehm is now well-nigh forgotten, and his name is only recollected by a few as that of the teacher of two of the most celebrated violinists of modern times—Ernst and Joachim. Forty-three years ago¹ Theobald Boehm came out in London as a flautist. He was considered an excellent performer ; and it was here that he made an acquaintanceship which was destined to render his name famous. It is an old tale and, it is believed, a true one, that the Boehm method of fingering was really the invention of Captain W.

¹ Boehm came out in London as a flautist in 1831, or fifty years before this article was written.

Gordon (an Anglo-Swiss), Captain of the Swiss Guards in the Paris garrison, and the pupil for the flute of Drouet. Gordon conceived his idea of flute improvements as far back as 1826, and in the following year flutes—imperfectly showing his invention, it is true—were made to his designs in Paris. The Revolution of 1830 deprived him of his position, and Captain Gordon believed he would be able to support his wife and family by his new flute. In an unlucky day he showed it to Boehm, then on a visit to London, and Boehm, finding Gordon poor,² at once “annexed” the idea for himself. Gordon heard that Boehm had begun the manufacture of flutes at Munich, and he followed him to that town. He arrived there in 1833, and spent six months in perfecting two instruments. Satisfied that his invention had reached perfection, he printed a prospectus of the new instrument, and published it in Great Britain, France, and Germany. He expected that orders for the new flute would pour in upon him. But the world is slow to accept improvements, and the unhappy Gordon retired heart-broken with his family to Lausanne. Maddened at seeing the results of his own talent attributed to Boehm, his brain became affected, and in 1836 it was necessary to confine him in a lunatic asylum.³ A fierce war arose in 1838 on the question of the invention of the flute, Gordon’s claims being stoutly championed from Paris, while Boehm replied from Munich. Although, therefore, the invention of the so-called “Boehm method” cannot in justice be attributed to the Bavarian flautist, there is no doubt the method was perfected by Boehm. In 1849 he introduced a genuine improvement in the tube

² This, I believe, is the first time that Boehm’s alleged annexational proclivities were said to be stimulated into activity by Gordon’s poverty. Gordon’s insanity had long before (p. 128) been brought forward as the supposed exciting cause.

³ A very different account of the origin of his insanity is given at p. 33, *q. v.*

of the flute, giving it a conical instead of a cylindrical head. At the Great Exhibition of 1851 the following report of the jury was published, signed by the late Sir Henry Bishop, the reporter :—

“M. Boehm’s inventions may be briefly described as follows: First, he brought the acoustical proportions of tubes and the finger-holes of wind instruments into correct numbers and measurement, by which means flutes, oboes, clarionets, bassoons, &c., can be theoretically constructed. Secondly, he has invented mechanism for the keys, which gives facility and precision to the execution, and by which the former difficulty of reaching or stopping the holes at great distances or of large sizes is now surmounted. As by these means the holes may be made correct in size and position, M. Boehm has acquired not only a perfection in tone and tuning never before attained, but also a great facility in playing in those keys which were hitherto difficult and defective in sonorousness or intonation.”

At the Paris Exhibition of 1855 M. Fétis, the reporter of the jury, expressed himself in similar terms. The French writer was, however, more honest than the English reporter in giving our own Captain Gordon his share of the credit.

Mr. William Pole, the reporter at the London Exhibition of 1862, alluded to Boehm as follows :—

“Boehm extended brass and other metals as materials for flutes, clarionets, and hautboys, at the same time that he introduced an entirely new and scientific system of construction, which has done more than anything else to lift this class of instruments to their present degree of perfection both of intonation and of timbre.

“Boehm, of Munich, the celebrated regenerator of flutes, clarionets, hautboys, &c., was appointed one of the jurors of this class, but for some reason he has not visited London. He has, however, sent for exhibition a geometrical diagram, with explanations, by which makers of

tubular instruments can, with the greatest readiness and accuracy, construct their instruments according to any of the recognised pitches. Having been applied to by many factors for new models, M. Boehm desired to give his diagram and explanation the greatest publicity and usefulness by sending them to this exhibition."

Boehm wrote several compositions for the flute, with, however, very little success. In 1847, Messrs. Schott of Mayence published from his pen a pamphlet 'On the Construction of the Flute and its new Improvements.'

LETTER FROM MR. W. S. BROADWOOD.

From the London 'Figaro' of January 1st, 1882.

I am glad, says 'Figaro,' to publish the following interesting letter from Mr. Walter Broadwood in defence of the late Theobald Böhm. The letter will speak for itself; and I will merely add that the question which Mr. Walter Broadwood thinks "not very material," whether Böhm did, or did not, originally annex or borrow his ideas or first notions from Captain Gordon, really formed the text of my remarks. Nobody doubts the ability with which Böhm subsequently developed those ideas, or his scientific or mechanical skill. The question of Gordon's claims was taken up by the late M. Fétis, and even more strongly in a pamphlet¹ on Böhm's invention printed forty-three years ago, soon after Böhm wrote his letters² of defence. Within the last week or two, those claims have been again advanced by the French and Belgian critics. I can, of course, only speak second-hand; and I have great pleasure in giving the *parole*

¹ That by Coche.

² There is only one letter of defence, that given at p. 129.

instead to Mr. Walter Broadwood, who not only knew Böhm well, but who has made a special study of everything connected with the flute:—

“CABALVA, RADNORSHIRE,
Jan. 1882.

“SIR,

“My attention has been called to an article in your journal, in which the writer brings charges against the late Theobald Böhm, of Munich, which are, as I think, both inaccurate and misleading.

“Your correspondent seems to consider that the main feature in Böhm’s improvement of flutes was a system of fingering generally (he says erroneously) attributed to him, but in reality ‘annexed’ from one Captain Gordon. This it was, says your correspondent, which made Böhm’s name famous. Gordon, we are told, invented and perfected this fingering; and after vainly advertising it throughout Great Britain, France, and Germany, he died of a broken heart, maddened by his failure to sell his invention, and by Böhm’s ‘annexation’ of it. We are not told why what in the one case failed so signally, succeeded in the other so completely.

“In justice to Theobald Böhm, whom I knew very well for nearly forty years, I venture to suggest an explanation.

“He was a man of very considerable scientific, as well as technical, attainments. Originally a gold-worker, he subsequently became an inspector of mines, besides being for many years first flute in the principal orchestra in Munich. Whether he did, or did not, borrow (‘annex,’ if your correspondent prefers that term) the first notions of what Sir H. Bishop in his 1851 Exhibition report calls a system ‘for reaching or stopping the flute-holes at great distances,’ is not very material. Böhm always claimed the invention of the fingering known by his name; and I am not aware that it has ever been proved that Gordon’s fingering was identical with it. The

question which your correspondent begs, and on which he founds very serious charges, has, as he admits, been very 'fiercely debated,' but not conclusively settled. Be that as it may, Böhm soon perceived that the really essential points to be determined, with a view to the improvement of his instrument, were :—

"1. The shape and proportion of the tube, more particularly of that part known as 'the head,' where sound is generated.

"2. The exact position and proportion of the *embouchure* and finger-holes.

"In order to solve these problems, Böhm set himself to study acoustics, under the well-known Professor Schafhäutl, and after several years' labour produced, as a result, (1) 'a cylindrical tube with conical head'; (2) 'a geometrical diagram' (I now quote from Mr. Pole's report, 1862) 'with explanations by which makers of tubular instruments can with the greatest accuracy construct their instruments according to any of the recognised pitches.'

"It is upon these calculations, and upon their practical application, that Böhm's fame rests. It is no exaggeration to say that their publication produced a revolution in the manufacture of wind instruments. So little did the merit of Böhm's invention depend on any one system of fingering, that it was applicable not to flutes only, but also to oboes, clarionets, and bassoons, which are fingered quite differently. At the exhibition (1851) competent and impartial musical judges pronounced it to be 'an entirely new and scientific system of construction, which has done more than anything else to lift this class of instruments to their present degree of perfection, both of intonation and of timbre.'

"If Böhm, originally like Captain Gordon, a poor man, had, like him, relied solely on a novel system of fingering, he would, probably, have been unsuccessful. In our days nearly every flautist has his own pet system

of fingering, of which he proclaims the superiority, and which at all events suits *him* best. Several of these have been adapted to Böhm's tubes, with more or less success.

"That Böhm did not 'annex' his scientific knowledge may easily be proved. His letters, of which I have still a considerable number, prove it conclusively. The head of the Pulteney Street firm, whose intimate practical knowledge of everything connected with the manufacture of pianofortes will be contested by no maker, whether English, French, or German, has repeatedly and ungrudgingly acknowledged the assistance afforded him years ago by Böhm when calculating what is termed the scale of grand pianofortes. He told me that he found Böhm very well versed in the acoustical bearings of that subject.

"But, to quote your correspondent's words, 'it is an old tale,' that of disputed inventions. A crude idea occurs to one man; it is developed and carried out, perhaps, by another. The former may have had neither the knowledge nor the perseverance necessary to mature his notion into practical utility. Yet he eventually claims, or his friends claim for him, all the merit of the invention.

"The French point triumphantly to Papin, the inventor of steamboats, as they assert, in Louis XV.'s time. My friend Mr. Hipkins, in his very able and interesting paper (see Grove's 'Musical Dictionary'), shows with more probability that Cristofori invented pianofortes. For the sake of argument, let us associate with them Gordon as the alleged inventor of the Böhm fingering: originator, if I rightly understood your correspondent, of the most material modern flute improvement.

"What would any of these, in their very different degrees of importance, say to their bantlings now full grown? Would they even recognise them? And what are *we* to say to those—if such indeed there be—

who would claim for the putative progenitors all the merit?

“I am, Sir,
 “Very obediently yours,
 “WALTER STEWART BROADWOOD.”

ARTICLE BY DR. SCHAFHÄUTL FROM THE
 ‘MUSICAL WORLD’ OF FEB. 18, 1882.

To the Editor of the ‘Musical World.’

CABAIVA, RADNORSHIRE,
 Feb. 13th, 1882.

SIR,

The German manuscript of the accompanying paper, with a translation by himself, which I have since re-cast, was sent me by Mr. J. P. Triggs, flutist, of Glasgow. He tells me that he received the manuscript, corrected and signed in Dr. Schafhäutl’s handwriting, from Mr. Schmidt, the publisher, of Heilbronn. I do not know whether it has been published in Germany, but I believe that it contains matter likely to interest English flute-players, and settles authoritatively the much-debated question as to the invention of the Böhm flute.

I am, Sir,

Very faithfully yours,
 W. S. BROADWOOD.

THEOBALD BÖHM, AND THE FLUTE CALLED
 AFTER HIM.

MUNICH, *January 23, 1882.*

It seems that the old dispute as to who was the real inventor of the “Böhm Flute” has again cropped up. It originated in Paris. The celebrated flutist,

V. J. B. Coche, who was one of the first to play the Böhm flute, who contributed more than any one to bring it into use in France, and who explained its merits in a pamphlet of his own composition (Paris, 1839), writes to Böhm, May 25, 1838: "On dit dans le monde artiste, que la flûte qui porte votre nom a été découverte par un nommé Gordon, ancien élève de Drouet."

The Gordon in question was a Swiss, who had served as an officer in the Gardes du Corps of Charles X., and had been pensioned after that king's abdication. He heard Böhm play upon his ring-keyed flute at a concert in London (1831); made Böhm's acquaintance; and conceived the idea of himself making a new flute that should be free from the defects of the old flute.¹ We shall become better acquainted with this "new flute." Gordon worked at it in Paris indefatigably with his own hands, and showed it to his teacher, Drouet. In a letter dated Feb. 15, 1833, he writes to Böhm: "J'ai vu Drouet à Paris; mais il recule devant un changement dans le doigté. Tulou en est là aussi."²

That Drouet and Tulou should have remembered Gordon when Böhm came forward with his own flute is easily to be accounted for; but that they should distinguish what was the fundamental principle on which

¹ The instrument on which Boehm played in his public performances, during his visit to London in 1831 was, as he states in his pamphlet, not a ring-keyed, but an improved old flute. He certainly showed Gordon a flute on which there was a ring-key, and Gordon appears to have conceived the idea of making an instrument which should be an improvement on that which Boehm showed him (see p. 89).

It is to this, I presume, that Dr. Schafhäutl here alludes, for Gordon had conceived the idea of making a perfected flute long before he knew Boehm, and had been engaged in endeavouring to carry it out for four or five years, and, when he made Boehm's acquaintance, he showed him the result of his experiments in the shape of an ingenious instrument of novel construction.—C. W.

² This passage does not appear in this letter as published by Boehm (p. 95), but in a postscript to it.—C. W.

the flutes of Gordon and of Böhm were constructed is more than could be expected of most artists ; besides which they were reluctant to acknowledge that the new was more and more superseding the old flute ; for Coche had already won over all musicians by his performances on the new Böhm flute.

I have frequently written concerning its origin ; for instance, in the Official Reports of the London Industrial Exhibition, 1851 (Berlin, 1852, pages 882-884) ; again, in the Report of the Jurors' Committee, Munich Industrial Exhibition, 1854 (Munich, 1855, pages 444-446) ; and finally, in greater detail, in the 'Allgemeine Musikalische Zeitung,' Leipsic, 1879, No. 39, pages 643-646.

Now that Gordon and Böhm are both dead, the former long since, the latter only towards the end of last year (November 25), I feel myself doubly compelled to make it clear to the musical public that Theobald Böhm is indeed the inventor of the flute which bears his name.

The eminent flutist, Theobald Böhm, was gifted not only with musical talent, but possessed also a genius for mechanism. After his appointment to the Royal Bavarian Orchestra in 1816, he made several cleverly designed flutes, with a special arrangement of key mechanism, for himself and for his master, Rapelle, also a member of the Royal Orchestra ; and, finally, in the year 1828, he set up a flute manufactory of his own in Munich. From this period dates the gradual adoption in England and France of the excellent system of key mechanism, designed and made by Böhm himself. The great success which Böhm achieved as a flutist in Munich and in Switzerland induced him at length to visit Paris and London, where the artistic refinement of his style, the fluency and certainty of his execution commanded general admiration. In London the extraordinarily large tone of the flute-player Nicholson, at that time so celebrated in England, surprised Böhm

who hastened to make his acquaintance, and soon found that the secret of the power of the Nicholson flute lay in the unusual size of the holes. But even so, the capabilities of the instrument were very limited, for, except that of F, no scale was quite in tune. The scales on the Böhm flute were all in better tune than those upon the Nicholson flute, as at that time manufactured by the English makers. Böhm had long been thinking of making a flute which should combine fulness of tone with accuracy of intonation; but he foresaw that this could not be accomplished without a change of fingering, and he knew how difficult it would be to induce musicians, who had practised one system all their lives, to take to another. During this visit to London, however, he finally resolved to carry out his long cherished purpose.

In December of the year 1832, his new flute with its new scale was finished. He soon mastered the new fingering, and in the succeeding year, 1833, played it in Paris, and also in London, with great success.

Savart, the professor of acoustics, at first received Böhm very coldly, and declared that to play the scale on the flute in tune in all keys was impossible, but when he heard Böhm do this he was so astonished that he himself introduced Böhm to the Academy.

In London Böhm created quite as great a sensation as in Paris. He particularly impressed Gordon, a retired colonel of the Gardes du Corps of Charles X. Gordon, who was a pupil of Drouet, and an enthusiastic flute-player, at once comprehended the advantages of the Böhm flute, renewed his acquaintance with Böhm, and was initiated into his system.³ He induced Böhm to

³ Dr. Schafhäutl does not appear to have been furnished with correct information respecting Gordon's movements. He is evidently not aware that, when Gordon visited London in 1833, he came from Munich, bringing with him the flute made there in Boehm's workshop, and that the object of his journey to England was to bring it out. We must either believe this or else

have a flute tube made for him at Munich by his best workman, but without keys; for he believed that the Böhm mechanism could be simplified so as to require eight keys only. To this notion he clung till the end of his days; undeterred by constant failure, or by Böhm's warning that to obtain power, equality, and freedom of tone, together with fluency of execution and accuracy of intonation, with a flute having thirteen sound holes and only eight keys, was an impossibility. This notion of Gordon's had already become a sort of monomania. He clung to it to the end of his life—a very sad end, as we are told.

Gordon left London "peu de temps après votre départ pour Munich," as he writes in a letter of the 15th February, 1833.⁴ He was then working, as we have seen, at a flute, with the thirteen holes of the Böhm system, but with only eight keys, which, as he wrote, he himself had made. This flute was barely playable in slow movements. In rapid passages, the very unequal tone frequently missed altogether. Gordon, however, ascribed these ever recurring difficulties of execution to bad workmanship; so that he looked upon the flutes he had made thus far as mere models.

In a letter from Lausanne, dated February, 1833, which lies before me at this moment, he requests Böhm to have a flute made by one of his very best workmen on his (Gordon's) model. Böhm answered that it would be better that Gordon should come to Munich. He

reject the evidence furnished by the letters of Gordon and his wife (pp. 132, 127).—C. W.

⁴ Gordon is here referring to his departure from London after his visit in 1831, not after that in 1833. It is impossible that he can refer to that of 1833, because, when the letter, from which the extract is taken, was written, the visit of 1833 had not yet been paid. Gordon passed the January of 1833 in Paris, whence he went to Lausanne, as he states in this letter, arriving there about the 1st of February, and on the 15th of the month he wrote the letter (see p. 29).—C. W.

followed this advice, and arrived in Munich, July 1833,⁵ where he remained till March 1834; Böhm placing at his disposition one of his most skilful workmen, but being himself away in London.

Model after model was made and rejected one after another. I myself at first witnessed these unsuccessful attempts. At length a well-made flute upon Gordon's model was finished, and he at once brought his invention before the public. In 1834 Gordon advertised his new flute in Paris, under the name of "La Flûte Diatonique," and brought out a lithographed 'Table of Fingering' for it.

In the introduction appended to his Table of Fingering for the "flûte diatonique, fabriquée dans les ateliers de Böhm," he says :

"La suppression des deux clefs de Fa dièze, [*sic*] est une idée dont l'application offre de grands avantages. *L'idée de cette clef de Fa dièze, communiquée par M. Böhm de Munich, a été avec son agrément adoptée pour la présente Flûte, dont elle complète les moyens d'exécution.*" This diatonic flute had, of course, the thirteen holes of the Böhm system; five of which remained open for the fingers (E, F, F sharp, B, and C sharp).

Gordon's eight keys intended for the other eight holes were connected with each other by contrivances of all sorts—a very puzzle of levers. Above the D sharp hole were the ends of three keys close together. Five keys had ends shaped like hackers (like the crescent of the moon five days before new moon), and these were for the shakes.⁶ They were placed in the shape of a sickle

⁵ Dr. Schafhäutl is here at variance with Gordon, who, in his letter to M. Mercier, dated July 15th, 1833, states that he was about, not to arrive at, but to leave Munich for London, his new flute being already finished (p. 132).—C. W.

⁶ In this description the Doctor seems to have confused the two Gordon flutes, of which drawings have come down to us. The eight keys and the five holes mentioned as remaining open for the fingers (those for E, F, F sharp, B natural, and C sharp) are

round the holes, so that when one key was pressed down it closed two adjoining holes. Gordon worked on with Böhm's best workman (Böhm himself being again away) with great perseverance, but none of his diatonic flutes satisfied him. At length despairing, he went back to Switzerland, and we have no reliable account of what became of him and his flute. It was reported that he threw it into the Lake of Geneva, and died in a mad-house. His own fixed idea appears to have completely over-mastered the intellect of that gallant and amiable gentleman.

In that same year (1833) Böhm went again to London, and created so great a sensation that the celebrated Dorus, then a young man, at once laid aside the old flute, and with his wonted energy and talent soon mastered the Böhm flute. In 1837 the Böhm flute was introduced into the Paris Conservatoire, after a committee—of which Savart, Prony, and Dulong were members—had borne the highest testimony to its merits.

In 1846 Böhm crowned his invention by substituting a cylinder for the old conical bore; he also introduced that parabolic curve in the head joint, which is necessary for correctness of intonation in the high notes. This flute obtained the Gold Medal at the Universal Exhibition

seen in the flute represented in Fig. 9 (p. 90), while the five crescents, "like the crescent of the moon five days before the new moon," appear in Gordon's other flute (Fig. 12, p. 107), four of them being "placed in the shape of a sickle round the holes." So, too, the flute represented by Fig. 9 was styled by Gordon *Flûte diatonique*, but the words *fabriquée dans les ateliers de Böhm* do not occur in the announcement of this flute (see the facsimile, p. 102). We are thus led to infer that Schafhäutl has taken his quotation from the *tablature* of Gordon's other flute, that figured by Coche.

Flute-players will, of course, understand that the crescents were not for the shakes, any more than are the rings of the Boehm flute. But now that we are in possession of the text of Gordon's announcement we can understand what gave rise to the Doctor's remark. Gordon speaks of five branches communicating with keys, and serving for the shakes (see the facsimile of the *tablature*).—C. W.

(London 1851), Berlioz taking an active part in the decisions of the jurors. Also at the Paris Exhibition, 1855, it carried off the Gold Medal, to which was added a most flattering acknowledgment of the merits of Böhm's system. At the present time the Böhm flute is played upon all over the civilised world.

Those who know how great is the distance which separates the conception of even the happiest ideas from their realisation and introduction in a practical form, will see a proof of the value of Böhm's system in the fact that it has at length established its position in the musical world, notwithstanding the long-continued opposition of many leading artists. In a letter to Böhm, already quoted, Gordon writes that Drouet and Tulou approved of his flute; but would not hear of a change of fingering.

Böhm's flute would have been rejected for the same reason had not its superiority been such as to throw into the shade all others—old or new. Thus I have again related in its general outlines the history of the invention and development of the Böhm flute. Probably I am the best witness as to the whole matter; for I lived over fifty-two years with my friend Böhm; under my guidance he devoted himself most perseveringly to the study of acoustics. I witnessed his innumerable experiments, which embraced all wind instruments, and which could only be carried out by one who united in his own person a practical knowledge of technical mechanism and of acoustic science.

That such a man should have borrowed from others the ideas upon which he founded the construction of his instruments is what no one can seriously believe.

In later years Böhm extended the compass of the flute, carrying it down from C to the low G, thus adding a new powerful and effective instrument to the resources of musical art. His key mechanism, now used upon all wind instruments of the better class, has already secured

for Böhm a permanent place in the history of musical instruments. The keys upon the foot joint of the flute, formerly supported by "cheeks" cut out of the wood and having a brass pin for axle—also the equally clumsy metal cups—were replaced by small pillars and slender steel rods and axles, revolving in the ball-shaped extremity of the pillar, and working with the accuracy and precision of a chronometer. The delicate steel springs of the mechanism furnished the means of uniting the action of keys placed at opposite extremities of the flute tube, and enabled the performer to cover a distant hole as perfectly, and with the same certainty, as if the key lay beneath the finger. Keys are indispensable for the large holes of the Böhm flute; they cannot be covered by the unaided finger. Upon the old flute the keys opened small holes; upon the Böhm flute the keys hermetically closed large holes. Böhm made with his own hands the first batch of his flutes; and he accustomed both his workmen and his successor to such finish of mechanism as has seldom been equalled and never surpassed.

(Signed) CARL VON SCHAFFHÄUTL,

*Doctor and Professor in the Royal Bavarian Academy,
University, and Conservatorium.*

PART II.

In summing up what Boehm has effected for the Flute, and not only for the Flute, but, as before observed, for all the fingered Wind Instruments, we can scarcely, I think, estimate this eminent man's services too highly. We see, from the sketch before given, the successive steps by which the ordinary Flute, as well as the Oboe, Clarionet, and Bassoon, have progressed from their primitive, single diatonic scale, to their present capacity of giving all the diatonic and chromatic scales, and that this was piling error upon error, the foundation being erroneous. It was Boehm who stood forward to oppose the deeply-rooted prejudices engendered by this long continuance in a wrong course; it was the enduring patience and perseverance of Boehm, that opened the eyes as well as the ears of those most blinded by former prejudices, to the value and importance of equidistant holes and open keys. He convinced their judgment as well as their senses. Many who at first opposed the movement from interested motives, as well as from prejudice, have at length yielded to the force of the truth. His senses must be indeed obtuse who cannot hear the superiority of the free tones gained by the open-keyed over the muffled tones of the close-keyed system, and who has not discernment enough to see that various sized holes must produce notes of various quality. It was Boehm who rendered these principles palpable; and if, in what I have to advance respecting the Flutes I have myself patented, I shall have to record some strictures upon Boehm's flute, they will be strictures, not so much on what he has done, as upon what he has left undone.—RICHARD CARTE.

AN EXAMINATION OF
MR. ROCKSTRO'S VERSION
OF
THE BOEHM-GORDON CONTROVERSY.

Judge not, that ye be not judged.

“BÖHM was not the ignorant impostor I once heard him called by a gentleman whose claim to celebrity rested on the invention of a key, which Böhm (a plagiarist by anticipation) had already used for his oboe fingering some years before.”

These words are taken from the preface to a little book, issued in 1882 by Messrs. Rudall, Carte, & Co., entitled, ‘An Essay on the Construction of Flutes, giving a History and Description of the most recent Improvements, with an Explanation of the Principles of Acoustics applicable to the Manufacture of Wind Instruments, originally written in 1847 by Theobald Böhm, and now first published. Edited, with the addition of correspondence and other documents, by W. S. Broadwood.’

This literary production is an English edition of a pamphlet issued by Boehm when he brought out his cylinder flute. This pamphlet was translated at the time from the original German into French, and published in Paris. It was Boehm’s wish that it should also appear in England. With this view he wrote the manuscript and presented it to Messrs. Rudall and Rose, who had purchased the right to patent the newly-

invented instrument. Boehm was well versed in colloquial English, but he had not mastered the language sufficiently to be able to prepare a work for the press; the manuscript therefore required revision, and Messrs. Rudall and Rose did not bring it out; indeed, it would never have seen the light had it not been for Mr. Walter Broadwood.

The 'Essay on the Construction of Flutes' cannot with propriety be called a translation of the German pamphlet; it is a new version of the work. There is scarcely a page in which it does not differ more or less from the original. In some places Boehm has introduced new matter; in others he has omitted whole paragraphs, whilst sentence after sentence is altered and remodelled. In editing the work, Mr. Broadwood has confined himself strictly to passages in which Boehm has either not written idiomatic English, or else has expressed himself in such a way as not to make his meaning clear. A comparison of the manuscript with the published text shows that not a single sentence has been either added or omitted.

Boehm's treatise, however, does not occupy much more than half of Mr. Broadwood's *brochure*. The other part consists of a preface by Mr. Broadwood, partly devoted to the Boehm-Gordon controversy, and partly to flute-gossip; of a collection of letters from Boehm to various English correspondents; of an English translation from Mr. Broadwood's pen of Boehm's explanation of his "diagram" for tuning wind instruments, and of an appendix containing an article in defence of Boehm by his friend Professor Schafhüttl.

As to the person the foundation of whose claim to celebrity Boehm, in the capacity of "a plagiarist by anticipation," had thus sapped before it was laid, no one, I believe, but Mr. Broadwood knew who was meant, and, as no one thought it worth his while to inquire, nothing more would have been heard of the matter had not a gentleman come forward, put on the cap, and pro-

ceeded to proclaim that it was a good fit. This was Mr. R. S. Rockstro, whose voluminous work on the flute was issued from the press last year.¹ Mr. Rockstro is of opinion that Mr. Broadwood intended to insinuate that Boehm's oboe key was identical with his great invention, "the Rockstro F sharp lever." He proceeds to defend the statement he has attributed to himself respecting Boehm's capacity and character, declaring that Mr. Broadwood's book is alone sufficient to justify the assertion that Boehm *was* an ignorant impostor. To use his own words: "the publication of this pamphlet (the 'Essay on the Construction of Flûtes'), Professor Schafhäutl's letter (also printed in Mr. Broadwood's work), and the hysterical adulation of extravagant partisanship have effectually disposed of the last remnants of Boehm's reputation as a scientific man."

We should naturally expect that Mr. Rockstro, holding such views as these, would do all he could to induce his readers to peruse the work in which the "ignorant impostor" is thus so completely pulverised by himself and his "hysterical" friends. This, however, it would seem; is far from being the case. Although he tells them that an English edition of Boehm's pamphlet "with some additions and many omissions," was "unfortunately" published in 1882, and that "much error was thereby disseminated," he quite forgets to give such information as would enable any one, who wished to possess the book, to order it of his bookseller, withholding the title under which it appeared, the name of the editor, and also that of the publishers.

The little work which the reader holds in his hand has been consigned by Mr. Rockstro to a still greater obscurity. It is true that the author's name has not been entirely excluded, like that of Mr. Walter Broad-

¹ *A Treatise on the Construction, the History, and the Practice of the Flute.* By Richard Shepherd Rockstro. Rudall, Carte, & Co., 1890.

wood. It is mentioned, and mentioned in very good company, for it appears amongst the subscribers to Mr. Rockstro's literary undertaking ; but it has not been admitted to the list of writers to whom that gentleman acknowledges himself to be indebted, nor is the book itself thought worthy of a place in the catalogue, a catalogue which fills no less than twenty pages, of the works which Mr. Rockstro has consulted in the compilation of his *opus magnum*. Nevertheless, Mr. Rockstro has done me the honour of making himself well acquainted with the contents, but so zealous is he for the welfare of flute-players, that when going over ground which I have already trodden, rather than be the means of disseminating error even indirectly, he prefers to allow it to be thought that he is exploring fresh woods, and roaming over the virgin soil of pastures new.

It seems, then, that it has been my misfortune to be the unconscious agent in casting another slur on Mr. Rockstro's "claim to celebrity" by repeating a statement to the effect that Captain Gordon was also, like Boehm, a "plagiarist by anticipation," inasmuch as the "Rockstro F sharp lever" was to be seen depicted in the drawing of his flute.

I blush to say that I must so far argue myself unknown as to admit that when I thus unwittingly reflected on its inventor's reputation, I knew nothing of the celebrated lever which sheds such lustre on the name of Rockstro. My offending was on this wise. I was acquainted with Augustus Buffet the younger, who has been so often mentioned in the first part of this work. Buffet's father was attached in the capacity of musical instrument maker to Charles Xth's Swiss Guards, in which regiment Captain Gordon held a commission. The King and the Court used frequently to move from Paris to Versailles and back again, just as our sovereign, in earlier and brighter days, was in the habit of going to and fro from London to Windsor. The Swiss Guards

accompanied the King, and Buffet the elder accompanied the Guards. Gordon, who was busy with his project for improving the flute, passed much of his time, when off duty, in Buffet's workshop, where his engaging manners and his tall and handsome person rendered him a welcome visitor.

As young Buffet (when I knew him an old man of eighty) worked under his father, he was constantly brought into contact with Gordon, and so was perfectly familiar with his earlier efforts in flute-making. Moreover, he informed me that he had in his possession for many years a copy of Gordon's 'Tablature,' or Table of fingering. When Coche published the drawing of Gordon's flute he did not give the 'Tablature,' and the drawing without the 'Tablature' to explain it was a puzzle to us in England. Some of its complexities seemed inexplicable. Neither Mr. Richard Carte, nor any one else with whom I was acquainted, was able to understand how the mechanism was intended to act. When on a visit to Paris I took the opportunity of asking M. Buffet to help us out of our difficulties, and he readily complied with my request. In the course of his remarks he pointed to an appearance in the drawing indicated by the letter *t* (see Fig. 12, p. 107), and said in French (in which language we were conversing) that it was a button for making F sharp without using either of the crescents.

I was so weak as to believe that Buffet was quoting Gordon's 'Tablature;' it never occurred to me to suspect that he was only supposing, and so I reproduced his words in this little volume. It was not long, however, before I discovered what a mistake I had made. In the year following, Mr. Rockstro issued a manifesto in the shape of a pamphlet,² "hastily written and compiled," as he tells us in the preface, "to meet what is believed to

² *A Description of the "Rockstro-Model" Flute*, by Richard S. Rockstro. Keith, Prowse, & Co.

be an immediate and pressing requirement, already far too long unsatisfied." In this pamphlet, after warning his readers not to confound the "Rockstro F sharp lever" with the key on Boehm's oboe, he proceeds to set Buffet right by adding "nor should it be supposed that the button in the diagram of Gordon's flute was intended for a similar purpose, the crescents by the sides of the holes leaving nothing of the kind to be desired." Moreover, in his great treatise on our instrument he has "ventured" to draw up a scale of fingering for Gordon's flute, from which it appears that Gordon did not know how to finger the instrument he had invented. The kindhearted Mr. Rockstro comes to his assistance, and shows the poor benighted man that when, according to Buffet, he used to put his finger on the button, he ought to have placed it on one of the crescents.³

It is, of course, intelligible that Mr. Rockstro should endeavour to cover with an extinguisher those who seem to him to be thus plucking the laurels from his brow, but it is not so apparent why he should wreak his vengeance on the unfortunate Boehm. What has the poor man done that he should be so rudely disturbed in his long sleep? Even if, as Mr. Rockstro alleges, he adopted certain of Mr. Rockstro's improvements, he was not alone. These improvements we are told "have been placed on so many different kinds of flutes, and have been appropriated by so many makers, that scarcely an open-keyed flute is now made on which some of them do not appear."⁴ Here, then, is legitimate food for powder and shot; not defunct brigands, but poachers still in the flesh, busily engaged in hunting in Mr. Rockstro's preserves. If Mr. Rockstro is eager for a fray, why does he not point out and pepper the rascals that are thus purloining his ideas? They are alive and can defend themselves, and would, perhaps, return his fire.

³ *Rockstro on the Flute*, section 575, p. 317.

⁴ *Ibid.*, section 679, p. 392.

Instead, however, of attacking these marauders, Mr. Rockstro follows the example of Sir John Falstaff, and leaves the living to discharge himself upon the dead. Indeed, he far outdoes Sir John; for when the doughty knight immortalised himself by his unparalleled exploit of killing a corpse, he was satisfied with inflicting on his prostrate foe a single stab. Not so Mr. Rockstro. He slashes, hews, and hacks away till his arm aches. Then we breathe more freely, for the fight seems to be over. But no; he is only pausing to take breath; he soon returns to renew the combat, and so the battle rages for round after round. At last he gets the *corpus* of his battered antagonist on the dissecting table, and having flayed it, proceeds to illustrate the old adage that "beauty is but skin deep" by pointing out how utterly unlovely he is (save in one small region, the left little finger) from the crown of his head to the sole of his foot.

Before Boehm was thus anatomised, although he was known to have a bad memory for dates, and, like Mr. Rockstro, a fondness for talking about science, it was never suspected that he was a blockhead. Indeed, the charge brought against him was that he was too clever by half. His eagle eye was said to have taken in at a glance all that was worth having on Gordon's flute, and in a few months' time, whilst Gordon was still "labouring" at his invention, he had brought the instrument out as his own, having metamorphosed it so completely that the inventor did not recognise his bantling.

But if Boehm's detractors thus threw doubts on the originality of his flute of 1832, his admirers pointed to that of 1847, the cylinder with the parabola head, which is supplanting the cone as surely as the pianoforte supplanted the harpsichord.⁵ Not one of the most jealous

⁵ "If I were a younger man," Boehm once said to me, "I would make a flute to be played like this," holding up his hands as if he were playing on a hautboy or clarinet. "I dare say," he added, "some one will do it when I am gone." Seven years after his death

of his rivals ever hinted that in the construction of this instrument he was indebted for a suggestion to a single soul. Messrs. Gerock and Wolf, who had a good opportunity of judging of Boehm's capacity, pronounced him to be a man of "uncommon powers of mechanical invention." The Society of Arts, when he was but a humble stranger in a strange land, recognised and paid a graceful tribute to his inventive talent by presenting him with their silver medal for a method of communicating rotatory motion.⁶ A railway carriage in which he was once travelling having been set on fire by a lighted ember from the engine (wood was used as fuel in Bavaria in the early days of railways), when the burning cushions had been thrown out of the window, he thought out a plan for so constructing the locomotive that such accidents could be prevented. Again, whilst working for a short time, when a young man, in a musical box manufactory at Geneva, he invented a labour-saving machine by means of which an important part of the mechanism of the musical box could be constructed in one-fourth of the time required for the hand process. In fact he seems to have left his mark on almost everything he touched. The production of iron is an industry of such vast importance that men of great ability give up their lives to it, and many of the best intellects of the time are engaged in furthering its aims; yet Boehm, a mere

an instrument so constructed was shown at the Italian Exhibition at Earl's Court.

⁶ The following is from the *Transactions of the Society of Arts* for 1834-35, vol. 50, p. 82 :—"The Silver Medal was presented to Mr. Theobald Boehm, Member of the Royal Chapel of Munich, in Bavaria, for his Method of communicating Rotatory Motion, a model of which has been placed in the Society's Repository. The usual modes of communicating rotatory motion from the first mover," the report goes on to say, "are either by means of wheels and pinions, or of two plane cylinders connected by a band. Mr. Boehm has suggested another method." A description of the method and two drawings of the apparatus are given.

outsider, devised an improved method of manufacturing steel which an iron-master in the North of England considered sufficiently valuable to be worth purchasing.⁷

Strangely enough, Boehm himself seems to have thought but little of the successful efforts of his constructive ability. Speaking, for instance, of his flute of 1832, he tells us that he had never placed a high value on it as an invention. On the other hand, he was fully conscious that he was exceptionally gifted. "I was never at a loss for an idea," he says, "and have often helped others on to success." In confirmation of this statement it may be mentioned that the Pöhlmann wire, which is still used in the manufacture of pianofortes of the highest finish, is said to owe its uniform excellence to advice given to Herr Pöhlmann by Boehm.

There is another invention of Boehm into which I shall enter more in detail, for it is connected with the story with which this work professes to deal, the origin of the Boehm flute. I mentioned in the first edition of this work that Fétis states that Boehm invented a new kind of pianoforte. The particulars of this invention have since come to light, and it appears that it was Boehm who first introduced the principle of overstringing, or stretching the bass over the treble strings so as to gain greater length of string without enlarging the case of the instrument; an idea which has been adopted by pianoforte-makers, and is now in use all over the world. The following account of it is taken from a paper on the 'History of the Pianoforte,' read before the Society of Arts by Mr. A. J. Hipkins, and published in the Society's Journal of March 9th, 1883.

"Almost simultaneously with it (the harmonic bar) has arisen a new development in America, which, beginning with Conrad Meyer, about 1833, has been advanced by the Chickering and Steinways to the well-known American and German pianoforte of the present

⁷ *Essay on the Construction of Flutes*, Appendix, p. 53.

day. It was perfected in America about 1859, and has been taken up by the Germans almost universally, and with very little alteration. Two distinct principles have been developed and combined—the iron framing in a single casting, and the cross or overstringing. I will deal with the last first, because it originated in England, and was the invention of Theobald Boehm, the famous improver of the flute. In Grove's 'Dictionary,' I have given an approximate date to his overstringing as 1835, but reference to Boehm's correspondence with Mr. Walter Broadwood shows me that 1831 was really the time, and that Boehm employed Gerock and Wolf, of 79 Cornhill, London, musical instrument makers, to carry out his experiment. Gerock being opposed to an oblique direction of the strings and hammers, Boehm found a more willing coadjutor in Wolf. As far as I can learn, a piccolo, a cabinet, and a square piano were thus made overstrung. Boehm's argument was that a diagonal was longer within a square than a vertical, which, as he said, every schoolboy knew."

It was on the authority of such *data* as these that Boehm was once considered to be possessed of some little ingenuity. Since, however, he has been so completely laid bare by Mr. Rockstro, scales have fallen from our eyes. Now that we know that he was nothing but an impostor, we see what a waste of time it was to debate the question, whether he did, or did not invent the flute called after him. He *could* not have invented it, had not his crass intellect been illumined by "an intelligence far superior to his own." We are thus "led irresistibly to the conclusion" that he stole it from Gordon. Being an impostor he must have stolen it; as he stole it he must have been an impostor. The meanest capacity would acknowledge that such an argument is irresistible.

And, on what a vast number of persons he contrived to impose! So many prize medals and similar distinc-

tions did he succeed in obtaining, that he had a drawer specially devoted to them. The old man seemed quite pleased, when, only a few weeks before his death, he opened it, and showed me his trophies. He little knew that even then the pen was at work which would unmask the gigantic imposture, and make it known that a prize medal when presented to Boehm, instead of being an honour to the recipient, "tells against" those by whom it is awarded.⁸ Did they not give him a gold medal at the Paris Exhibition of 1855, and another in London in 1851, for the ill-tuned instrument he exhibited on these occasions? Pretty jurors, indeed, they must have been to offer a gold medal to an impostor. To such lengths can folly go that Berlioz, who was one of them, himself a flute-player,⁹ assured his brother jurymen that the eight-keyed flute, the instrument on which he was accustomed to play, when compared with Boehm's, was only fit to be heard at a fair. Berlioz, however, did not succeed in climbing the pinnacle of absurdity. "It was reserved for an amateur of Plymouth," we are told, "to perpetrate the crowning folly. 'The Boehm flute,' wrote this gentleman, 'is as superior to the old eight-keyed instrument, as is the latter to the one-keyed flute.'" ¹⁰ Yet the Plymouth amateur was but an usurper. Justice requires that the crown should be taken from his head, and placed on that of one whom Mr. Rockstro regards "with feelings akin to reverence," M. Victor Coche, Professor of the flute in the Paris Conservatoire of Music. M. Coche makes the comparison with a twelve instead

⁸ *Rockstro on the Flute*, section 911, p. 617.

⁹ Berlioz was not, like most composers, a pianist; his two instruments were the flute and the guitar. When he was a young man, his father, who wished him to enter the medical profession, succeeded in inducing him to learn his bones by the bribe of a brand new flute with all the latest keys.

¹⁰ *Rockstro on the Flute*, section 645, p. 368. The amateur of Plymouth was Dr. Kelsall. The letter in which he makes the statement quoted by Mr. Rockstro will be found at p. 339.

of an eight-keyed flute, and pronounces the difference to be not only as great, but even still greater.¹¹

But if Boehm must be regarded as an impostor when viewed in the light of an inventor or a man of science, Mr. Rockstro admits that in the character of a pirate he gives proofs of genius of the highest order. Indeed, his skill in appropriating the ideas of others was only equalled by the effrontery he displayed in feigning ignorance of the source from which these ideas were derived. He copied *more suo*, we are told by Mr. Rockstro, most of the improvements that had been introduced in England and France, but except in one instance, and that was in a private letter, he "invariably failed to acknowledge his obligations." He seems to have been ever on the look out all over Europe for improved flutes, just as a gigantic octopus stretches out its arms in search of the crustacea on which it preys, seizes them, draws them in, sucks them dry, then throws aside the empty shells, and passes them by in disdain.

Mr. Rockstro is smarting under a sense of a personal slight of this kind which he believes he has suffered at the hands of Boehm. It appears that on examining flutes sent out from Boehm's factory since the year 1864, that great epoch in the history of our instrument when "the Rockstro Model" made its appearance on this planet, Mr. Rockstro is under the impression that he has detected traces of his own improvements; so much so, that he avers that Boehm did not scruple to copy him in many particulars. Yet "the ruling passion," we are told, "was strong within him almost to the end of his long life"; for when he had entered his eighty-fifth, if not his eighty-sixth year, and so was standing

¹¹ "Si l'on prenait pour point de comparaison la flûte vulgaire à six trous et à une clef, on pourrait dire que la différence entr'elle et notre flûte à douze clés, est moins grande que celle qui existe entre cette dernière et la flûte de Bôhm."—Coche's *Examen Critique*, p. 3.

on the brink of eternity, he confessed that he had committed the offence (a crime of which Mr. Rockstro will not admit that he was guilty) of never having heard of the "Rockstro Model." Indeed, he added insult to injury, and proceeded to declare that the perfection which he had been informed by a correspondent had been claimed by Mr. Rockstro for his flute could be "nothing than humbug," on the ground that "anybody who understands anything of acoustics or mechanism knows that nothing is perfect."¹²

Even in this stage Mr. Rockstro's portrait of Boehm is not very pleasant to contemplate, yet it is quite bright and attractive in comparison with the hue it is to assume before it is finished. It is not till Mr. Rockstro comes to the Boehm-Gordon controversy that he begins to put on his more lurid colours. Up to this time Boehm is only represented as an impostor, a thief, and a lying and contemptible hypocrite; he now begins to appear as a veritable fiend.

The charge which used to be brought against him was that he was deficient in a sense of truth and honour. It was alleged that he took "ideas" from Gordon's invention when shown to him in London on the occasion of a call, and embodied them in the Boehm flute, but that when called upon by a rival to admit that the instrument which bore his name was the discovery of a gentleman of the name of Gordon, he declined to give that gentleman the credit of the so-called discovery. This was the old story; but now Boehm becomes a monster of perfidy from whom we recoil with disgust and loathing. The "ignorant impostor," it seems, was far too stolid to take in Gordon's ideas when that gentleman's flute was shown to him in London; but he saw enough to sharpen his appetite. Accordingly the scene of the robbery changes from London to Boehm's house at Munich. The spider has invited the

¹² *Rockstro on the Flute*, sections 911, 912, pp. 615-19.

fly to walk into his parlour, and the invitation has been accepted. Here Boehm, whilst pretending to assist Gordon in his efforts to complete his invention, with the malignant cunning of a Mephistopheles induces him to reject the system which he is at the same time slowly, silently, and secretly appropriating.¹³

If, during his researches into the history of the flute, Mr. Rockstro had lighted upon what seemed to be indisputable proofs of the truth of such allegations as these, he would have acted wisely had he sought the advice of his friends before publishing them to the world, seeing that all the actors in this little drama have gone to their long rest, and charges against the dead are from their very nature *ex parte* statements. But what are we to say when we have good reason for knowing, as we have, that this repulsive story is purely fictitious; that the loathsome scene here depicted is but the riot of a too exuberant imagination; when Mr. Rockstro himself adduces evidence, if other evidence were wanting, which shows that the Boehm flute was finished before Gordon entered Boehm's house, and that, whilst he was staying there, Boehm, instead of acting the nefarious part here assigned to him, was engaged in the harmless occupation of learning to play it? It is true that Boehm was not a man of high position; but to a flute-player his good name is as much the immediate jewel of his soul as it is to a Lord Chancellor or an Archbishop. For my own part I would rather steal the design of a dozen flutes, and be twice as untruthful as Mr. Rockstro represents Boehm, than I would allow myself to blast the character of one resting in the grave, however safe and easy the task might be, even if he were the humblest clodhopper that ever followed the plough.

It is only fair towards Mr. Rockstro to say that he shows some compunction for what he has done. He

¹³ *Rockstro on the Flute*, section 608, p. 340; section 629, p. 354.

tells us that he has reopened the discussion with much regret. Commenting on this expression, a critic writes: "He may discover that it will be closed to his greater sorrow." To defend himself he raises the cry, so often heard before, of "Justice to Gordon!" As if ample justice had not been done to Gordon long ago by Boehm himself, who speaks of his talents, of his ingenuity, of his courage, of his modesty, of his high sense of honour, and of his loyalty to his engagements, bears testimony to the respect in which he was held, and sums up by declaring that he was "a gentleman in every respect." Gordon was not aware that he had been wronged. When he saw Boehm's flute, so far from invoking justice or showing resentment, he asked and obtained Boehm's permission to make use of some of the ideas it suggested. It was not Gordon who was aggrieved, but the would-be flute-inventors, and their grievance was that Boehm towered high above them all. Does Mr. Rockstro suppose that his readers are so stone-blind as not to perceive that this petty but acrimonious dispute is the outcome of trade rivalry, and flute-constructors' jealousy? That "Justice to Gordon!" when translated from the language of flute-makers into plain English is "Down with Boehm!"

At this point, if we could believe Mr. Rockstro to be given to jesting, we should credit him with treating us to an excellent joke. He offers to produce a witness who he assures us is "absolutely disinterested." The "absolutely disinterested" gentleman steps into the box, when whom do we recognise but one of the most ambitious of Boehm's would-be rivals, a rival, however, over whom his triumph was complete, our old friend Mr. Cornelius Ward. In 1831 Gordon employed Ward to make a flute; but instead of giving him a second order, he transferred his business to Boehm. Some years afterwards, Ward brought out a flute of his own "which should afford greater mechanical facilities than had been

attained by Gordon, Boehm, or Coche ;”¹⁴ in other words, to oust the Boehm flute from the market. This revolution Mr. Ward believed to have commenced as soon as his flute made its appearance, for he informs us that it at once had the happy effect of “directly displacing the Boehm in several instances.”¹⁵ How this gentleman can be said to have contemplated the scene from the disinterested pinnacle of philosophic indifference we are not told.

Unluckily Ward’s evidence is as unsatisfactory as his disinterestedness is questionable. He deals in opinions and generalities. There is an instance, it is true, in which he gives us a specific statement, and that is when he informs us that the holes of Gordon’s flute “were placed consistently with the proper length of tube required for each fundamental note in the chromatic gamut” ; but we are told by Mr. Rockstro that on this point he was not competent to give evidence, for the holes of his own flute were so badly arranged that his judgment was worthless.¹⁶ Ward states that Gordon had “contrived a method of acting upon the additional

¹⁴ *Rockstro on the Flute*, section 640, p. 364.

¹⁵ Ward’s letter to the *Musical World*, see Appendix, p. 329.

¹⁶ See *Rockstro on the Flute*, section 568, p. 311, and compare the passage with another to be found in section 599, p. 335, of the same work. According to Mr. Rockstro, Ward, like Boehm, placed his holes too far apart (*Rockstro on the Flute*, section 642, p. 365), both he and Gordon, following Pottgiesser, having determined the position of the holes by the divisions of the monochord (section 599, p. 335), a method which Mr. Rockstro in another place (section 348, p. 168) pronounces to be fallacious. Yet, although he declares this method to be fallacious, when Boehm stated that Gordon’s flute was out of tune he is charged with injustice ! (section 590, p. 328). Indeed, we are informed by Mr. Rockstro that it was not until he himself took up the subject that what he believes to be “the first attempt to arrange the positions of the holes of a wind instrument according to any rational system” was made (section 669, p. 384). This being the case, the circumstance that Ward was blundering, and poor Boehm groping in the dark, becomes more intelligible.

apertures beyond the number of fingers,"¹⁷ but he gives no account of the mechanism by which he accomplished his purpose. He says that he heard Boehm play on a flute "very similar in principle" to that which he made for Captain Gordon,¹⁸ but he does not attempt to show that the means employed for carrying out the principle on the two instruments were identical. He gives us his "decided opinion" that Gordon was entitled to more credit than Boehm, but he omits to give us the facts on which his opinion rests. If instead of giving us his "decided opinion" he had given us a drawing, or even a close description of the instrument he made for Gordon, he would have furnished us with valuable evidence. He tells us, it is true, that it closely resembled a drawing of a different instrument, but he fails to inform us where the resemblance is to be found.

In private he appears to have made use of language which he was either afraid or ashamed to publish. We are told that his printed statements were studiously moderate in comparison with the latitude of expression he allowed himself in his conversations with Mr. Rockstro. But whilst he was thus shouting "Stop thief!" at the top of his voice, the "absolutely disinterested" gentleman was quietly walking off, without the shadow of an acknowledgment, with Gordon's original idea, the crank and wire mechanism. Nor was Gordon's the only invention he appropriated. If we may believe Mr. Rockstro, he collected together the proposals of the greater part of the flute-reformers of the preceding sixty or seventy years, and converted them into his own property. The specification of his patent included no less than seven flutes, on examining the drawings of which Mr. Rockstro has discovered embodied in them not only the ideas of Boehm, Gordon, Coche and Buffet, but even those of the earlier German

¹⁷ See note 12, p. 26 of this work.

¹⁸ Ward's letter to the *Musical World*, Appendix, p. 329.

workers Pottgiesser,¹⁹ and Tromlitz. Nay, more; not content with annexing the inventions of the past, this seer-eyed kleptomaniac turned his attention to the discoveries of the future, and devised a crescentic touch

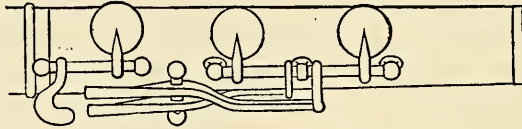


Fig. 14.—Ward's crescentic E flat key. From the specification of his patent.

for the E flat key; a contrivance which Mr. Rockstro "designed"²⁰ ten years afterwards. Yet the "disinterested" Ward cries "Shame!" on Boehm who, instead of taking out a patent, had made the world a present of his invention.²¹

¹⁹ *Rockstro on the Flute*, section 640, p. 363.

²⁰ *Ibid.*, section 670, p. 386.

²¹ An idea of the nature of Ward's disinterestedness may be gathered from a perusal of the following extract from his pamphlet:—

"Our patent was obtained, and our flute adopted by many of the first amateurs, who speedily demonstrated its superiority. A little previous to this time no small stir and commotion had existed in the flute world, both of makers and performers, in reference to our invention, then only partly disclosed. As its qualities, however, became developed, it became very soon evident, both to makers and to players, that the days of the old flute were numbered, no person of the smallest musical sensibility hesitating a moment in opinion; the performers who had attained eminence by genius or indomitable industry might indeed wear their hard-earned laurels without descending to go to school again; but it was clear that the new flute would become the instrument of the rising generation. Flutes of the costliest description were sold for a third or fourth of their cost, and were replaced by the new invention; and the demand on the old makers was suddenly interrupted. Othello's occupation was gone. The result was anticipated. Experiments had been instituted, invention put into requisition, to produce something original, and mysterious rumours were circulated, on the *montes parturiunt* system, of some forthcoming wonder. All

But it is not only as an absolutely disinterested witness that Ward is held up for our admiration ; he is pronounced to be "Boehm's superior in every way except in the matter of musical attainments." Still,

these attempts proved abortive. On the completion of our patent, embracing, as it was found to do, the results of almost all possible experiments and desiderata, all these schemes and pretensions were dissipated to the winds ; and the expedient at last resorted to, because nothing else was left, was to fall back upon the formerly reviled and persecuted Boehm ; to discover, all at once, that it was perfection, and to confess how very unjustly and ignorantly they had condemned it. The praise of these parties is worth as much as their former censure, and, in its turn, may have to be revoked."

Having thus made known what, in his opinion, were the motives which induced Messrs. Rudall and Rose to take up the manufacture of the Boehm flute, the "absolutely disinterested" gentleman turns his attention to Mr. Card, who had also crossed his path by bringing out an improved flute.

"Other parties," he continues, "not prepared to proceed so far (*vulgo* 'to go the whole hog'), attached bits and morsels of the Gordon or other flutes to their own. Indeed, as we have mentioned the 'ANIMAL,' the whole affair brings forcibly to mind the proceedings described by Cowper, after Mahomet's mysterious edict against the porcine genus :—

' Much controversy straight arose ;
 These chose the back,—the belly those.
 By some 'twas confidently said,
 He meant not to forbid the head.
 Whilst others at that doctrine rail,
 And piously prefer the tail.'

This hotch-potch, piece-meal affair, the appropriators do not hesitate to name their 'New Patent Flute'—patent, forsooth ! because it retains the old patent tuning head of Potter.

"But it is time for us to return. We should not have troubled our readers with these matters, but that they form the strongest species of evidence, that of rivals in trade, as to the amount of importance attached to our invention, as well as to the certain fate of the old flute. How otherwise can be explained the bustle, the inventions or rumoured inventions, the pilferings or appropriations, the false announcements, and deceitful appellations we have described ? How are men brought to eat their own words, and to bepraise as immodestly a mediocre instrument, as they before immoderately condemned it ?"—Ward, *The Flute Explained*, p. 15.

notwithstanding his superiority, the flute he made for Gordon only added another to that gentleman's list of failures, nor was it until he had recourse to the "ignorant impostor" that Gordon succeeded in producing an instrument which he could venture to bring before the public. Ward's own flute, too, quickly died a natural death, whilst that of his inferior in every respect has been advancing from strength to strength for nearly sixty years. Then again, Mr. Rockstro himself showed his appreciation of Ward's superiority in a singular way. In his younger days he was on terms of friendship with Ward, and played on his flute, but he deserted his friend and abandoned his instrument for that invented by the "ignorant impostor." And yet, judging from Mr. Rockstro's description, it was not possessed of charms which Mr. Rockstro found himself powerless to resist. At this time the Boehm flute was, he tells us, "an inherently imperfect thing,"²² with mechanism which, notwithstanding "its apparent simplicity, was constantly out of order";²³ its tone was "lamentably inferior" to that of the best patterns of the English eight-keyed flute; whilst its holes were placed so "extravagantly" out of their proper position, that it was "outrageously"²⁴ out of tune. Still, in spite of all this, it was the means of seducing Mr. Rockstro from the path of loyalty to his friend.

The story of Mr. Rockstro's seduction is quite romantic; it adds another to the many proofs we already possess of the gigantic power of fascination. The serpent is not an attractive beast, still the little bird, after hovering for a while round its ugly head, flies straight into the repulsive reptile's gaping mouth. The fox is not an animal to which a fat turkey would desire to have an introduction, but the poor creature turns giddy, loses its balance, flutters down from the tree in which it is

²² *Rockstro on the Flute*, section 643, p. 367.

²³ *Ibid.*, section 594, p. 331.

²⁴ *Ibid.*, section 644, p. 367.

securely perched, and falls a helpless victim at Reynard's feet, as he gazes at her in silence from below.

Mr. Rockstro seemed to have a foreboding of his approaching fall; he therefore took precautions. Before entering into temptation, he made "a stipulation that no persuasion should be used."²⁵ But what did this avail? The moth might as well make a stipulation on approaching the candle. The stipulation was loyally kept, but all to no purpose. Mr. Rockstro's powers of resistance quickly evaporated, his virtuous resolve melting away as melts the snow before the sun. It was not long before he threw himself, uninvited, into the tempter's arms, and, like the fair but frail Julia,

"whispering 'I will ne'er consent'—consented."

"My determination," he writes, "soon began to waver, and before the expiration of six months I sold my flute, a proceeding for which poor Ward never quite forgave me, and began to practise steadily on"—on what?—on the "lamentably," the "extravagantly," the "outrageously," the "inherently imperfect thing," produced by Ward's inferior in every respect, except in the matter of musical attainments.

And now comes a grand display of the wonders of science—of real, genuine, Rockstro science, not the spurious Boehm article. Indeed, the sequel, more marvellous even than science, reads like a fairy tale; it is a modern version of the story of "Beauty and the Beast." I shall not avail myself of the fairy's spell to transform Mr. Rockstro, as he has thought proper to transform Boehm, into Ward's inferior, or into an inferior of any sort or kind, but into a loving and compassionate being in whose pure unsullied breast no poison of envy, hatred, or jealousy has ever rankled; a gentle maiden whose disposition is as sweet as perfume of the roses

²⁵ *Rockstro on the Flute*, section 925, p. 633.

amongst which she dwells ; whose heart is as soft and tender as the strains she draws from the harpsichord on which her fingers stray. No sooner, then, had Beauty been united to the Beast than the "inherently imperfect thing" began to yield to the magic of the fairy's wand. Its holes, placed so "extravagantly" far apart, drew themselves miraculously together ; a re-born crescent rose to gleam from the touch of the E flat key ; whilst the dry old stick, like Aaron's rod, put forth a bud, and soon the "Rockstro F sharp lever" blossomed on the parent stem. In fact, to cut a long story short, the "most wretched" ²⁶ old monstrosity, which Beauty

²⁶ "The earlier metal flutes made after the model of Boehm were most wretched in tone, as well as in intonation, and it was only after a series of improvements, culminating in 1864, that they became the charming drawing-room instruments they are at present." So we are told by Mr. Rockstro in the 320th section (p. 145) of his *Treatise on the Flute*. But a gentleman who devoted himself exclusively to drawing-room playing, and was acknowledged to be the most finished drawing-room player of his time, writing to Boehm in the name of the firm of which he was the head, and underscoring the words here italicised, expresses himself as follows : "The French seem to be going from your original intention, and their instruments are not equal to your silver flute in our possession ; there is not the *slightest doubt* as to the *vast superiority* of your metal flute over every other. Indeed, we think that there is no wind instrument that possesses so many charms." Referring to a metal flute of Boehm's make, he adds : "The *Name* of the Flute has been suggested by a Gentleman of Classical Knowledge and a Flute-Player of great Taste, as the most expressive of its perfections, viz. *the Siren Flute*." This was not written in the year 1864, when the silver star was

"Riding near her highest noon"

in the meridian of the Rockstro model, but on the 2nd of September, 1847, just after the new luminary had appeared above the horizon, it having emerged from the creative brain of Boehm in the previous year. The gentleman who wrote thus of this "most wretched" drawing-room instrument was Mr. George Rudall. Whether Mr. Rudall was, or was not, qualified to judge of the tone and intonation of a drawing-room flute may be gathered from the following account of his playing given by Mr. Rockstro : "It was

"again and again" had striven to love, but had "always" relinquished "in disgust,"²⁷ vanished, and there burst upon the gaze of an astonished and delighted world a new and "charming" model; a model whose birthday, we are told, ought never to be forgotten by him who is about to select a flute,²⁸ for the name of this peerless form is Perfection.

But we must descend from the region of fancy to the prosaic sphere of historical fact. The spring of 1831 found Boehm and Gordon both in London. Boehm

always a source of regret to his friends that Rudall could never be induced to play in public; he even declined an invitation to play before George the Third, but as a drawing-room player he was immensely popular. I well remember my delight on first hearing him play; I thought that he produced the most charming music I had ever heard. Though his tone was not powerful, it was so clear, so sweet, and so indescribably sympathetic, that, once heard, it was not likely to be forgotten. His expression was absolutely enchanting, and his execution, as far as it went, perfect."

Mr. Rudall does not confine himself to his own opinion. In another letter he mentions the effect the "wretched" instrument produced on those who heard it. "You know," he writes, "that I am not a player of difficult passages, but I have played in my own style in a great number of parties, and your metal flute has astonished and delighted every one. They all exclaim that they had no conception of the flute being brought to such perfection." He admits, however, that one of the notes was not satisfactory. "There is some little imperfection about the D, which Clinton says that you are aware of; if so, there is no fear of your capacity to remedy it."

²⁷ *Rockstro on the Flute*, section 668, p. 383. So convinced were musicians in Paris of the superiority, for orchestral purposes, of the instrument (Boehm's cylindrical flute with the parabolic head joint) which excited Mr. Rockstro's disgust, that they brought about its compulsory adoption, to the exclusion of all other flutes, in those orchestras for which there was a State subvention. Moreover, it was rendered obligatory on the players engaged to use metal flutes, yet Mr. Rockstro tells us that flutes made of metal "are, and must be, eminently unfitted for orchestral performance" (section 320, p. 145).

²⁸ *Ibid.*, section 703, p. 413.

appears to have come to England on a musical errand, if we may judge from the circumstance that he was engaged to play the flute at the Philharmonic and other concerts. But whatever might have been the primary object of his visit, he soon had an opportunity afforded him of employing his talent for invention.

Gordon was on his travels in search of a flute-maker. After devoting some years to his project of improving the flute, he considered that he had succeeded in the year previous, 1830. But though satisfied with his invention, he was very much dissatisfied with those he employed to carry out his design ; for not one of their instruments was playable. Parisian flute-makers having failed, he tried Swiss watch-makers, but in vain. Thus foiled on the Continent, he determined to have recourse to the flute-playing island, and accordingly he came to London and put his model into Mr. Ward's hands. Ward's efforts only resulting in another disappointment, he decided on consulting Boehm, who, as we have seen, was busy with his inventions at Gerock and Wolf's, in Cornhill.

It was during the call which Gordon made on Boehm for this purpose that the theft of his invention is alleged to have been perpetrated.²⁹ We have it, however, on the authority of Gordon himself that Boehm told him on this occasion that it was his intention on his return home to try to make an improved flute (*une flûte perfectionnée*), and that he promised to send him one of these perfected instruments.³⁰ Now if Boehm had not in his mind the intention of making such a flute before Gordon entered the room, we must credit him with a rapidity of conception simply superhuman. The idea of appropriating the design Gordon was showing him, of bringing it out as his own, and of crowning his piratical achievement with the daring stroke of genius of sending

²⁹ *Supra*, p. 153.

³⁰ *Infra*, p. 419.

Gordon his own invention in a new dress, must have flashed through his brain with more than the speed of lightning.

It is, of course, unnecessary to point out that the accusation brought against Boehm was a defamatory libel. It affected his character for honour, honesty, and trustworthiness, and so was calculated to injure him as a man of business. It should not be forgotten that Coche, Clinton, and Ward, by whom the defamatory statements were put forth, were all of them men who had set themselves up in opposition to him as rivals in the flute trade; and it is significant that Coche did not make the discovery that the Boehm flute was invented by Gordon until he became a flute-maker, whilst Clinton was loud in his defence of Boehm as long as he taught and sold the Boehm flute, but no sooner had he put on the market a flute of his own, than he joined the hue and cry against him. Moreover, not one of these gentlemen comes into court with clean hands. Each of them had taken what suited him from Boehm's invention; Coche boasting that he had copied the Boehm flute with the most scrupulous exactitude, whilst both Ward and Clinton had adopted the ring mechanism of that instrument. Nor was this all. Clinton openly acknowledged that he had taken the idea of one of his keys from Gerock and Wolf's flute, which was the production of Boehm; whilst Ward, in addition to his annexation of Boehm's ring-keys, had secretly appropriated Gordon's crank and wire system. The spectacle of Boehm hunted by such pursuers as these on the ground that he was a bigger wolf than either of themselves, with Mr. Rockstro as huntsman to the pack, lustily winding his horn, and waving aloft his model flute, as he follows in the chase, is truly edifying.

In endeavouring to ascertain whether or not there is any foundation for the allegations put forward by the

libellers of Boehm, the first thing we should wish to see would naturally be a drawing of the flute which Gordon showed Boehm on the occasion of the interview to which reference has just been made, it being the instrument from which the ideas were alleged to have been stolen. Ward, had he thought proper, might have furnished us with such a drawing, but for reasons best known to himself he has left us in the dark. But, although the flute from which Boehm was alleged to have derived his ideas was gone for ever, on looking into the case I saw that there was available evidence of still greater value. Before the interview took place, "I had already made in London," says Boehm, "the model of my new flute, and I showed him (Gordon) all that I had made." I was able to point out that a drawing of this model which Boehm showed to Gordon was still in existence.

It came to light in the following way. The overstrung pianoforte was not the only invention on which Boehm was engaged at Gerock and Wolf's; he undertook to make for this firm an improved flute. This flute was finished, and Mr. Wolf was endeavouring to introduce it to the English players whilst Ward was still engaged in constructing Gordon's instrument.³¹ An engraving of the instrument survived, for Gerock and Wolf had published a 'Scale and Description of Boehm's Newly-invented Patent Flute,' manufactured and sold by the Patentees only, Gerock and Wolf, 79 Cornhill; and a copy of this publication, believed to be unique, was in the possession of Mr. Richard Carte. Now, on comparing two expressions used by Boehm in his letters, it became apparent that this instrument was the model which Boehm showed Gordon on the occasion of the call to which I am referring.³²

This discovery threw a new light on the subject; a light which, as will be seen, proved very disastrous to the

³¹ See Ward's letter to the *Musical World*, p. 329.

³² See p. 85.

libellers of Boehm. It enabled us to examine the case from a better standpoint than that of mere assertion and denial ; it being obvious that any ideas we find embodied in this model, from whatever source Boehm might have obtained them, could not have been taken from Gordon's flute, inasmuch as the model was finished before he saw that instrument.

How does our historian deal with all this ? He does me the honour of repeating my quotations, which identify Gerock and Wolf's flute with Boehm's first model, and he acquiesces in my conclusion that they are one and the same ; but the use to which he and I put the instrument is very different. Mr. Rockstro converts it into a stick with which to beat Boehm. He declares Boehm to have been "particularly reticent" about the rod he had thus unwittingly put into pickle for his own back, and ignoring the circumstance that hundreds of copies of the engraving of it had been struck off and scattered over the world in this little book, he treats Gerock and Wolf's pamphlet as a thing specially preserved by good fortune and Mr. Carte for his own purpose. Taking the 'Scale of Fingering,' which he reprints, as a handle, he proceeds to belabour the poor old man with all his might.

Judging from Mr. Rockstro's representations, the instrument was a disgrace even to an impostor. It is true that he does not profess to have either seen or heard it, but this drawback presents no difficulty to him. Endowed with the gift of clairvoyance, he enjoys the use of spiritual eyes and ears, and what they reveal to him "must be" as reliable as Gospel-truth. Indeed, in his short description of this flute we are called upon to swallow no less than five *musts*. Unless there was a mistake in the scale, the high E "must have been" horribly flat, and much worse than the same note on a one-keyed flute ; the high F "must have been" at least three-quarters of a tone higher than the next semitone below, although the fingering for this note "may be a misprint" ;

the fingering given for the high G "must have" rendered that note nearly a quarter of a tone too flat as compared with next two notes below; the instrument itself "must have been" far inferior, on the whole, to the ordinary eight-keyed flute as generally made in England; whilst the notes of the third octave especially "must have been more out of tune than on any well made one-keyed flute, or any eight-keyed flute ever constructed." In addition to all these *must-have-beens*, one of Boehm's vent-holes was "most improper," and the holes of his foot-joint, if the engraving is to be trusted, were "shockingly" ill-placed. Nor does Mr. Rockstro confine his slashing blows to Boehm. He flies at Gerock and Wolf, who were guilty of the crime of encouraging the "ignorant impostor," and administers a stinging backhander, denouncing their flute as an imposture, and by implication branding these gentlemen as impostors because they did not carry out their design of taking out a patent; Boehm having, as we have just seen, announced his intention of constructing a flute with still greater improvements soon after this instrument was completed.³³

³³ In the extract given in this work from Gerock and Wolf's pamphlet announcing their new flute, I commenced in the middle of a sentence, and Mr. Rockstro, to make amends for ignoring my existence, has paid me the flattering compliment of beginning at the very same word. In the pamphlet, however, the extract was preceded by an historical sketch, as follows:—"The flute, in its earliest and most simple state, was recognised and appreciated as one of the most effective of musical instruments, but, from the peculiarity of its construction and consequent irregularity of its scale, remained long intractable, even in superior hands, except in the two or three keys that were natural to it, and into which keys all music intended for it was necessarily transposed.

"The mellifluous quality of its tone, however, created so general a desire that it might be rendered more extensively available that invention had a powerful stimulus to improvement, and ingenious men succeeded in attaching keys, that amounting in the end to eight or nine in number, widened in a surprising manner the sphere of its usefulness in skilful hands; and then it was found to possess

But whilst we are watching Mr. Rockstro as he is thus engaged in kicking the dead lion, we are losing sight of matters of greater importance. Leaving what Gerock and Wolf's flute "must have been" to Mr. Rockstro, let us consider what it was. Whether it was better or worse than a one-keyed flute, we know "that Mr. Wolf displayed considerable talent in his performance upon it."³⁴

capabilities for expression as well as tone that were not previously supposed to belong to it. Hence the practice of the flute became universal, so as to supersede in a great measure that of the violin, from which only had hitherto been expected accuracy of intonation and variety of expression, which it was now found might be elicited, though probably in a minor degree, from the flute.

"The sanction of public favour on its behalf attracted the talents of first-rate masters, and original compositions for this interesting instrument increased in number and in science until it was found unequal to all the variety that was required from it, and deficient in accuracy upon some passages, more or less, according to the abilities of the performer who drew forth its powers; and, both in the orchestra and in the drawing-room, desires for still greater perfection, especially in concerted music, became generally manifested.

"Acting on this impression, the patentees, Messrs. Gerock and Wolf, having availed themselves," &c. For a continuation of this extract see p. 85 of this work, and section 583, p. 323, of Mr. Rockstro's *Treatise on the Flute*.

There is no date to this pamphlet, but we learn from Ward's letter to the *Musical World* (p. 131) that it was published by Messrs. Gerock and Wolf at the time they made the flute—that is in the year 1831. Mr. Rockstro, however, gives 1832 as the year in which it was issued (*Rockstro on the Flute*, section 582). It turns out, however, that the authority for this date is of the *must have been* kind. The pamphlet was reviewed in the *Harmonicon* of April 1832; ergo, according to Mr. Rockstro, it must have been issued in that year. Mr. Rockstro's *Treatise on the Flute* was reviewed in *Musical Opinion* of February 1891, so if we are to trust such logic as this, the work was issued in 1891; but if this is the year in which it must have been issued, as a matter of fact, it was distributed to the subscribers in the summer or early in the autumn of the preceding year 1890.

³⁴ Ward's letter to the *Musical World*, see Appendix, p. 329.

Whether or not it was inferior to any eight-keyed flute ever made, it was an instrument on which English flute improvers (with the exception of Mr. Ward, who, Mr. Rockstro has ascertained, adopted ideas of German origin) lived for twenty years; it being the source from which Card,³⁵ Clinton, Siccama, and through him Pratten, drew their inspiration.

To us, however, its chief value lies in the light it throws on the charges brought against Boehm by his libellers. These libellers I now purpose bringing to trial. But in their trial I will not confine myself to the information to be obtained from the drawing of this flute; I will avail myself also of the facts brought to light by Mr. Rockstro. Indeed, we will engage this gentleman in a double capacity; we will subpoena him as a witness for the prosecution, and at the same time retain him as counsel for the defence. We shall find his evidence strangely at variance with his advocacy. The one is a continuous vindication of Boehm, the other as constantly vilifies and loads him with ignominy. In fact, like Balaam of old, whilst striving with all his might to curse, Mr. Rockstro finds himself constrained at every step to bless.

In the indictment under which the libellers will be arraigned there will be five counts. They will be charged with publishing statements to the effect that Boehm took from Gordon, *first*, the idea of making an excavation to receive the lower lip; *secondly*, the idea of how to find the division of the column of air; *thirdly*,

³⁵ Ward, in his letter to the *Musical World*, pronounces Card's flute to be "a part" of Boehm's first model, and in the extract just given (note, p. 189) from his pamphlet he terms the instrument a "hotch-potch affair." But whilst he was thus throwing Card's "annexations" in his teeth, he was concealing so carefully the chief source from which his own hotch-potch was derived that Mr. Rockstro did not discover it for forty-four years. See his *Treatise on the Flute*, section 489, p. 262.

the idea of constructing flutes on a system of open keys ; *fourthly*, the fingering of the Boehm flute ; *fifthly*, the idea of the ring-key. We will see how far they can defend themselves by establishing that their allegations are true either in substance or in fact.

First, *the excavation to receive the lower lip.*

Was Coche's statement that Gordon was the first to make such an excavation³⁶ true or false? Alas, poor Coche! You little knew when you made this assertion what occasion you would have to exclaim, save me from my friend! We will put Mr. Rockstro into the witness-box, and he will at once tell us that before Gordon was born, Dulon, the blind flute-player, when on his travels, visited Lüchow, where he made the acquaintance of and played duets with "a most engaging and intellectual man, whose well-contrived flutes were far superior to many manufactured by so-called masters." This was Dr. Ribock, an enthusiastic amateur, and a zealous worker in the field of flute reform, who invented keys, endeavoured to improve the bore, and wrote a treatise on the instrument. Dulon mentions that the Doctor had a fancy for "an excavation he was in the habit of making in that part of the head-joint of a flute which rests on the chin, thinking by that means to bring the flute nearer the mouth, so as to prevent any slipping in the event of the chin perspiring."³⁷

As to the advantage believed to result from the use of this excavation Coche held a different opinion to that advanced by Dr. Ribock. He considered it to be a cure for the hissing, which is as great a reproach to our instrument, as is scraping to the fiddle. But however this may be, the substitution of a flattened for a cylindrical surface where the instrument is brought into contact with the lip is certainly a pleasant change. Moreover, the excavation can be so made as to cause the siphysis

³⁶ P. 126.

³⁷ *Rockstro on the Flute*, section 868, p. 568.

of the chin to share with the teeth the pressure of the flute, a matter deserving consideration when we take into account the vital importance of the lower incisors to the flute-player.

Secondly, *the statement that Gordon was the first to find the division of the column of air.*

The division of the column of air is a fine phrase, and the use of it serves to show what a scientific man was Coche. As a matter of fact, however, as I will point out before I have done, it is a disputed point whether science has or has not succeeded, even to this day, in putting her finger on the division of the column of air within the flute.³⁸ One of the two principles on which the Boehm flute is founded is that the holes should be equalised, or

³⁸ *Infra*, p. 297. An erroneous notion was once prevalent that the proper place for the finger holes could be discovered by a calculation based on the divisions of the monochord, an instrument on which a stretched string is furnished with a movable bridge, by means of which the precise length of string required for each note can be ascertained. Ward, whilst admitting the difficulties of the calculation, does not seem to have the slightest doubt but that "the apertures should be placed consistently with the ratio of the divisions of the monochord." He even goes into details, adding: "The lengths of the tubes for each of the fundamental notes of the flute must be each about one and a half inch shorter than the monochord indicates." Gordon had adopted this method of tuning his flute, and Coche stated that he was "the first to" thus "find the division of the column of air," but Mr. Rockstro has ascertained that Pottgiesser had previously had recourse to this plan. Coche fancied that Boehm also had employed this method. "After he (Boehm) had settled the proportions of the bore," I am translating from Coche's *Examen Critique* (p. 13), "dividing the portions of the column of air as those of the monochord, he assigned to the holes a size and relative distance, calculated according to the proportion of the tempered notes." Boehm, however, who was aware that this idea was illusory (see p. 463), had adopted a very different way for fixing the approximate position of the holes of his conical flute of 1832. He made a series of experiments for the purpose. See his *Essay on the Construction of Flutes*, p. 19; also *infra*, p. 415. It will be observed that Coche falls into a fourfold error. He is under the belief first that the true place for the holes of the flute can be ascertained by a calculation based on the

at least properly graduated in size. When this principle was adopted, it became necessary, in order to tune the instrument, to arrange them at distances from each other diminishing from below upwards in a regular ratio. Stripped of the jargon of science, it is this equalisation of the holes, and their consequent rearrangement, which Coche here attributes to Gordon. In this Coche does not stand alone; Clinton followed him, and stated that this "new principle" "resulted from the sagacity of Captain Gordon."

Now, Mr. Rockstro, you are under examination, will you tell us if this statement is correct? Poor Coche! Mr. Rockstro gives his revered friend another knock-down blow; but he is an iconoclast of so singular a kind, that when he has smashed his idol, he still regards the fragments with unabated reverence. He proceeds to inform us that the German school of flute reformers, who preceded Boehm and Gordon, were fully alive to the importance of a rearrangement of the holes. Tromlitz, the master of Dr. Ribock, and Dr. Pottgiesser, another worthy son of Æsculapius, who had devoted his leisure to the improvement of our instrument, had both attempted to deal with the problem; indeed, Pottgiesser had gone so far as to equalise the size of all but two of the holes.³⁹ The idea, then, was not new, nor did it result from the sagacity of Captain Gordon.

But how came it to pass that the holes of the flute were in so sad a plight that a reformation was thus imperatively demanded? The law of the survival of the fittest, not having contemplated the contingency of man becoming a flute-playing animal, had made no provision for causing certain of his fingers to develop until they

divisions of the monochord; secondly, that Boehm had arranged the holes of his flute on this principle; thirdly, that Gordon was the first to make the calculation; and fourthly, that Boehm had availed himself of Gordon's discovery.

³⁹ *Rockstro on the Flute*, section 543, p. 292.



Fig. 15.—Eight-keyed Flute.

had become long enough for his requirements, and the flute-makers, following out the plan adopted with such signal success by the prophet Mahomet in his treatment of the mountain, as the fingers would not come to the holes, had brought the holes to the fingers. To borrow the beautiful language quoted in Coche's scientific and philosophical pamphlet: "The piercing of the holes was, mathematically and acoustically speaking, vicious, for their position was calculated only on the possible extension of the digits of man, and not according to the immutable laws of physics."

The culprit amongst the digits to whose charge the crime of misplacing the holes must be laid, was the third; the finger of Apollo, the god who, finding himself worsted in his musical contest with Brother Marsyas, was not ashamed to take a mean and unfair advantage, and having in this way obtained an award in his favour, did not wait, as the humane Mr. Rockstro would have done, until our poor brother was dead, but proceeded to tie him to a tree, and to flay him forthwith.⁴⁰

⁴⁰ What a farce was this so-called contest! At first the umpires appear to have believed that it was to be a *bonâ fide* competition, and so when Apollo and Marsyas had each played an air, they did not attempt to disguise the truth that the flute, which could sustain tone, was better adapted for giving effect to a melody than the lyre. Thereupon, Apollo began to sing as well as to play, and Marsyas to protest, on the ground that Apollo was using, in addition to the lyre, another instrument, his voice. Apollo replied, that as Marsyas was using his mouth, he was at liberty to do the same. The jurors could not have failed to see through such sophistry as this. It must have been as evident to them as it is to us that the voice and the mouth are very different things; that Apollo was at liberty to

A glance at an eight-keyed flute (Fig. 15) will show that the third finger of each hand had drawn its hole (*a* and *e*), upwards far above its proper place. Fig. 16 is a diagram showing the relative size and position of the holes, which are here represented in one line. From this we see that in the worse case, that of the right hand, this finger had arrogated to itself a hole (*e*) at least five times as far from the next below as it was from the next above, although the musical interval was in each case the same, that of a semitone.⁴¹

Let us now turn to Boehm's first model, the flute designed for Gerock and Wolf, the instrument which Mr. Rockstro does

use his mouth only if it would assist him in playing the lyre. By this time, however, no doubt it had become evident that the umpires dared not give an honest judgment. No one can believe for a moment that Apollo would have consented to be flayed, if they had decided against him. The glittering fellow would have reduced the whole party to ashes, or destroyed them with pestilence, as he did the subjects of Laomedon, who refused to satisfy the demands he made on the occasion of the building of the walls of Troy. That Marsyas had the sympathy of public opinion may be inferred from the circumstance that so many tears were shed for him as to give rise to a river which was called by his name.

⁴¹ "If we instance no farther than that from the low E flat to the E natural (but one semitone) there are nearly two inches and a half to cut off; and for the next semitone only about half an inch; for the next about the same; and then for the next about one inch and a quarter, and so on, we feel sure we need not say another word to convince every one of the excessive absurdities of its construction."—Ward, *The Flute Explained*, p. 5.

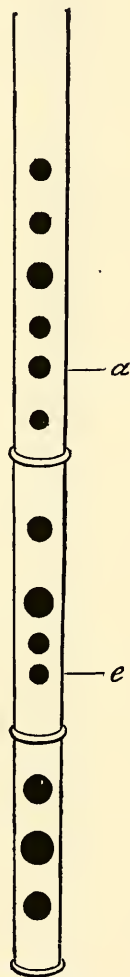


Fig. 16.—Diagram of Holes of Eight-keyed Flute, showing their Relative Size and Position.

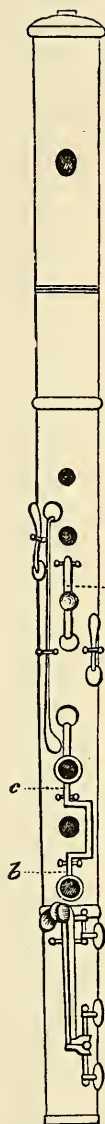


Fig. 17.—Boehm's First Model.

not deny that Boehm had made before he came into contact with Gordon.

To spare the reader the trouble of turning to a distant page, I have reproduced the engraving of it (Fig. 17), and on examining it we see that Boehm, when he constructed it, was no stranger to the importance of remedying the mischief. He had dealt with both of the offenders, the third fingers, but he had not dealt with them both in the same way. In the case of the right hand he had brought the finger to the lowered and enlarged hole (*b*), carrying down with it the whole hand. The left he treated differently, keeping the hand in its old place, but furnishing the third finger with a key (*a*) to enable it to act on its hole, now placed beyond its reach. At present we will confine our attention to this key, leaving the mechanism adopted for the right hand until we come to the fifth count of the indictment.⁴²

⁴² A special drawing, here reproduced, of this key is given in Clinton's *Treatise on the Flute*. We owe it to the practice but too common, as we have seen, amongst flute-makers of throwing discredit on their rivals by endeavouring to make it appear that



Fig. 18.—Boehm's Key, after Clinton.

their ideas are not original. Thus Clinton, in attacking Siccama, published this drawing to show that the key, which was characteristic of Siccama's Diatonic Flute, was taken from Gerock and Wolf's instrument.

It will be observed that there is no bed for the

It should not be supposed that there was the slightest novelty in Boehm's proposal. This expedient had often

been resorted to in the construction of flutes of unusual size long before it was applied to the concert flute. It appears, for instance, in Fig. 19, which represents an interesting instrument ⁴³



Fig. 19. — Flute showing Valve for closing the third hole.

pad of the key, but that Boehm has had recourse to another well-known expedient for securing a stop. He has lined the hole with a tube, the edge of which rises above the level of the wood, and thus forms what flute-makers call a saddle. It may be conjectured that Boehm also lined the holes *c* and *b* (Fig. 17) with tubes, and that the rings for these holes, being made a little larger than the tubes, when pressed down, passed outside of and encircled the ends of the tubes, and thus the fingers came into contact with their projecting rims. What makes this not improbable is the circumstance that it was in this way that Boehm constructed his metal flute when, in its earliest form, the holes were so small that they could be closed with the finger. In his conical wood flute of 1832, however, Boehm adopted a different plan. He excavated a groove in the wood to receive the ring when it was pressed down; an expedient which Pottgiesser had previously adopted for his crescent key. See the drawing, p. 83.

⁴³ The material of this instrument is boxwood, stained of a dark colour. It is 30 inches in length, irrespective of the doubled portion (7 inches) of the head. The head is made out of a single piece of wood. The ascending and descending portions of the bore are not united by a metal elbow, but open directly into each other. The opening above their



Fig. 20. — Base English Flute, with key for the third hole.



Fig. 21.—Siccama's
Diatonic Flute.

belonging to a Belgian gentleman, Mr. Césaire Snoeck. Indeed, this key may be traced back to the bass English⁴⁴ flute, as shown in Fig. 20, an instrument which is also the property of Mr. Snoeck.

Now, although this key was quickly discarded by Boehm, it is remarkable as having formed the chief feature of a flute which forty or fifty years ago bade fair to oust from popular favour the eight-key flute, which, though it subsequently yielded to the cylinder, Boehm's cone had failed to supplant. I allude to Siccama's diatonic flute, of which Fig. 21 is an engraving. It will be seen that Siccama

junction is closed by a large cork. The cork is concealed by the brass cap which covers the upper end of the instrument. The hole for the third finger of the left hand, covered by the open key, is placed far away from the hole above. The three holes for the right-hand part are brought within reach of the fingers; the first finger hole, for tuning purposes, being made very large and sloped upwards from the exterior in the substance of the wood, whilst that for the third finger is very small in proportion and is sloped downwards.

⁴⁴ The performer on the bass English flute played sitting, the wind being conveyed from his mouth to the top of the instrument by means of a tube, which in this case is a restoration. The instrument was often fitted with a rod at the bottom, forming a foot to rest it on the ground, as in that represented in the engraving. The lower end of the instrument thus being closed, a hole was provided, placed in this specimen at the back, for the lowest note. The total length of the flute here represented is 4 feet 6½ inches; the instrument itself measuring 42 inches, and the foot 14½ inches. It bears the maker's name, J. Boekhont; below it is a lion rampant, above, a crown. It will be understood that the key for the little finger of the left hand is an open, not a closed key like that of the instrument represented in Fig. 19. It appears closed in the engraving, owing to the spring, which should keep it open, happening to be broken.

did not confine the use of this key, like Boehm, to the left hand, but that he had recourse to it for the right as well (Fig. 21, *a, e.*)

In borrowing this key from Boehm, poor Siccama, like Gerock and Wolf, has fallen under the ban of Mr. Rockstro's displeasure. He is held up to contempt, and is made the subject of an attack which I do not hesitate to say is as unjust as it is uncalled for. His want of inventive genius is represented to be only exceeded by his ignorance of the flute; whilst we are asked to believe that his motive in becoming a flute-maker was the gratification of his vanity; his object being to bring out a flute associated with his name. The popularity of his instrument is ascribed partly to his commercial skill in advertising, and partly to an appeal he is stated to have made to the cupidity of flute-players by presenting one of his flutes to any professional flautist willing to take up his system. As to the instrument itself, if it is not pronounced to be, like the Boehm flute, "an inherently imperfect thing," it is stigmatised as "an unnatural and unphilosophical combination of two incompatible things."⁴⁵ In short, in Abel Siccama, as painted by Mr. Rockstro, we are treated to another portrait, this time, it is true, only a miniature, of an ignorant impostor.

I speak from personal knowledge of Mr. Siccama, on whose flute I once played, and with whom I have spent many hours in conversation on the subject of flute-making, when I say that this portrait is as unlike the original as it is sordidly and ungenerously drawn. Siccama was a German by birth. He was a good classical scholar and an accomplished modern linguist. Before he became a flute-maker, he was engaged in tuition at Oxford. His enthusiasm for the flute was unbounded. His chief aim was simplicity of construc-

⁴⁵ *Rockstro on the Flute*, sec. 646 *et seq.*, p. 369.

tion ; the pet object of his ambition being to contrive a chromatic flute without keys ; an ideal which, however visionary it may be, will be acknowledged by all flute-players to be a consummation devoutly to be desired. He got so far with his project as to design a flute with only one key, a closed key for C natural played with the first finger of the right hand (Fig. 22) ; but he assigned one of the holes, that for G, to the right thumb, an expedient which has been a source of failure in flutes made both before and since his time, as this thumb cannot be spared from its work of holding the flute.

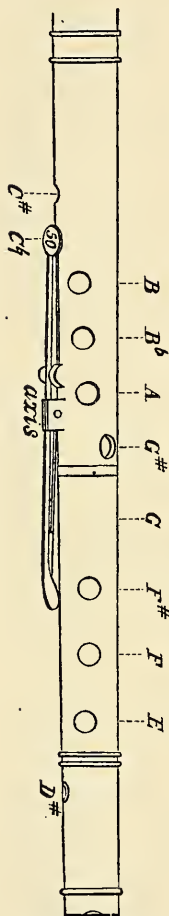


Fig. 22.
Siccama's One-keyed
Chromatic Flute.

The instrument by which Siccama was known to the public is his diatonic flute (Fig. 21, p. 208). It is perfectly true that he claimed perfect intonation for this flute ; but here Mr. Rockstro, who is in a glass house, cannot with propriety commence throwing stones. Whatever can be said against the diatonic flute, it is unquestionable that in its finish and workmanship the highest degree of excellence was reached, and that its tone was of surpassing beauty ; indeed, Siccama, when preluding on it, used to elicit notes which exceeded in purity and sweetness any sounds I have ever heard issue from a musical instrument.

In accounting for the success of this flute Mr. Rockstro imputes bribery to Siccama and corruption to his brother artists. Perhaps I may be allowed to say that I was well acquainted with Richardson and Pratten, it having been my

privilege to receive instruction from each of them, and I have too high an opinion of them both to believe that the present of a Siccama flute would have been a sufficient inducement to either of them to adopt the system, unless he honestly believed it to be superior to that of the eight-keyed flute which he discarded for its sake. Siccama's diatonic flute, as I have said, is pronounced by Mr. Rockstro to be an unnatural combination of two incompatible things; yet for Pratten, who attempted to perfect this unnatural combination, the union of the old fingering with the new distribution of the holes, there is nothing but praise, and Mr. Rockstro confesses that he was highly gratified at being asked by that gentleman to assist in the work, and that he had great pleasure in complying with the request.⁴⁶

In justice to Mr. Rockstro I ought not to omit to mention that in his sketch of Mr. Siccama he assigns to him one redeeming feature; he adopted the plan Mr. Rockstro afterwards followed, and "avoided the mistake of placing the holes generally too far apart." Indeed he had made a Boehm flute which I often saw at his office in Fleet Street, for which he claimed that the intonation was far more correct than that of the instruments constructed with the holes placed where Boehm recommended.

On the other hand, three of the four flutes included in the specification of Siccama's patent are pronounced to be "absolutely worthless." Yet on looking at the engraving of these absolutely worthless instruments, what do we see? Alas! poor Siccama, you are undone! You have committed the unpardonable sin. You are another plagiarist by anticipation. There is the oboe key of the unhappy Boehm; the fatal button of the luckless Gordon (43, Fig. 23). Stay; is there not a

⁴⁶ *Rockstro on the Flute*, sections 671, 672, p. 386.

loophole through which you can escape? You have shifted the hand a semitone upwards, so that your lever does not close the hole for G like Mr. Rockstro's, but that for G sharp. But this will not avail you. Your key is played, as the description too clearly shows, by the same fingers of the same hand as that of

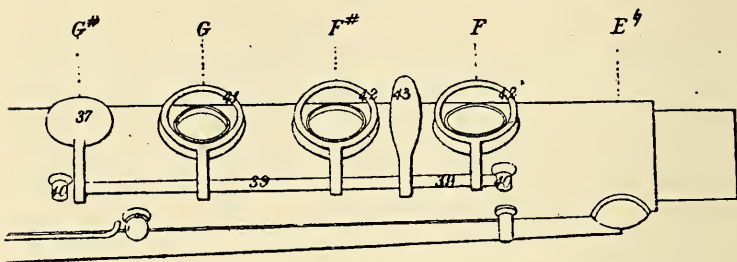


Fig. 23.—Siccama's Lever for closing the G sharp hole.

Mr. Rockstro, and its object is the same, to close the valve without using either of the rings.⁴⁷

There is nothing new under the sun. When examining the wind instruments in the Museum of the Paris Conservatoire, what should my eye light upon but a bass flute on the Siccama plan made certainly half a century, possibly a century before Siccama was born. So little attention had this instrument

⁴⁷ The following is from the specification of Siccama's patent (p. 5): "37 is a valve over the G (G#) sharp hole; this valve is kept open by the spring 38, except when closed by the fingering, and it is affixed by an arm to the axis 39, which turns in the bearings 40, 40. 41, 42, 42', are rings affixed to and forming arms on the axis 39, so placed, as that when the first finger of the right hand closes the G (G#) natural hole, one or the other of these rings will be depressed, closing the valve 37; or the valve 37 may be closed by either the second or the third finger of the right hand pressing upon the arm 43 on the axis 39." The italics are mine.

attracted, that the maker's name (J. Beuker) had not been properly deciphered for the catalogue, in which it was incorrectly given, nor had it been observed that the place where it was made (Amsterdam) was branded on one of the joints.⁴⁸ I happened to have in my pocket at the time an ordinary inch measuring tape, with which I took some measurements, whilst M. Gustave Chouquet, the then Curator of the Museum, kindly made for me a sketch of the instrument—rough, it is true, but still sufficiently accurate to show the two Siccamas keys. (Fig. 24.)

As to the date of this flute, opinions differ. M. Chouquet believed that it was made towards the close of the seventeenth century; but M. Victor Mahillon, the Curator of the Museum of the Brussels Conservatoire, considers this date to be too early. However, my description⁴⁹ appears to have had the happy effect of stimulating Mr. Rockstro. He has been furnished by M. Pillaut, M. Chouquet's successor, with further particulars and fresh measurements; he has also made many efforts to discover the exact date of its manufacture, but up to the time of the publication of his 'Treatise on the Flute,' his labours had not been crowned with success.

Thirdly, *the substitution of open for closed keys.*

The closed keys: what a tale of prejudice, conceit, and obstinacy can these keys unfold!

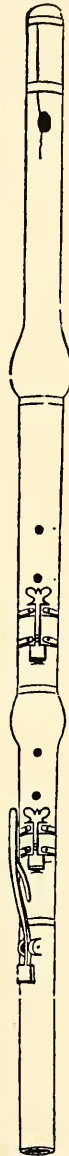


Fig. 24.
Old Bass Flute on
the Siccamas Plan.

⁴⁸ This was set right in a subsequent edition.

⁴⁹ See p. 74 of this work, 237 of Mr. Rockstro's.



First Flute.



Second Flute.

Fig. 25.—Angels playing a Flute Quartett. From a Manuscript Service Book



Third Flute.



Fourth Flute.

in the Library of the Abbey of St. Gall (1562). The original is charmingly coloured.

Air de Cor pour les Flûtes d'Allemand.

The image displays a musical score for a flute piece. It consists of four staves of music, each beginning with a treble clef and a common time signature (C). The notation is written in a style characteristic of 19th-century music, featuring diamond-shaped note heads and stems. The first staff includes several measures with a double bar line and repeat dots, and a few notes marked with an asterisk (*). The second and third staves also contain repeat signs. The fourth staff concludes the piece with a final cadence. The overall appearance is that of a historical manuscript or printed score.

Air de Cour pour les Flûtes d'Allemand. (In Modern Notation.)

The image displays a musical score for a piece titled "Air de Cour pour les Flûtes d'Allemand." The score is presented in modern notation and is divided into four parts, labeled 1st, 2nd, 3rd, and 4th. Each part is written on a single staff. The 1st part begins with a treble clef and a key signature of one sharp (F#). The 2nd, 3rd, and 4th parts also begin with a treble clef. The notation includes various rhythmic values such as eighth and sixteenth notes, as well as rests and phrasing slurs. The 3rd part features a complex, multi-measure rest. The 4th part concludes with a double bar line and repeat dots. The overall style is that of a classical flute piece, likely from the 17th or 18th century, adapted for modern notation.



Fig. 26. — Keyless Cylindrical Flute.

In olden days our instrument was a simple cylinder without a single key. Fig. 25 is a representation of four angels, two of the masculine and two (judging by the way the hair is dressed) of the feminine gender, engaged, whilst dancing on the clouds, in playing a quartett on these keyless flutes. On the next page is an 'Air de Cour' specially written, Mersenne, from whose work it is taken, tells us, as a short illustration of the style of composition suitable for four such flutes, by the Sieur Henry le Jeune, who, he says, is perfectly familiar with their compass and their stave (*portée*). To show what sort of music our great-great-grandfathers and grandmothers were accustomed to read, I have given a facsimile of the original; I give it also in modern notation, to which it has kindly been reduced by Dr. Turpin. The composer, I should add, was possibly an amateur, for Mersenne refers those of his readers who may desire other examples of such music to the masters of the art.

An instrument of the kind on which the angels are performing is represented in Fig. 26. This precious relic, which formerly belonged to Count Giovanni Correr, is now in the Museum of the Brussels Conservatoire of Music. Its material, of a pale coffee colour, is stated to be Cyprus (cypress?) wood. In front, above the embouchure, is the maker's name, Rafi, associated with a trefoil, whilst below it is a shield bearing a griffin, a device which is repeated between the third and fourth finger-holes. The instrument is $28\frac{1}{2}$ inches long, and the diameter of the bore is $\frac{6}{8}$ ths of an inch.

These keyless cylindrical tubes were pierced with six finger holes. These six holes, with the addition of that which formed the open end of the tube, served to produce the seven notes of the scale for which the flute was intended. There were no holes provided for accidentals. When the player was in want of an accidental he had recourse to an expedient from which we should naturally imagine every member of the celestial quartett party would recoil with horror; he proceeded to murder the note above the semitone required by smothering, choking, and suffocating it till it yielded an expiring murmur, or dying groan, which did duty for the sound required. It was the spurious notes thus produced, with their feeble wheezing tone and defective intonation, which brought the flute and those who played it into such contempt with musicians; a circumstance which did not escape the observation of Burney, but which Hawkins failed to perceive.

Now it is a fact, that when the *Sieur Henry le Jeune* composed his 'Air de Cour' for four keyless flutes, closed keys, so far from being unknown, had attained a development which would be incredible were it not for the drawings which have come down to us. It would seem that closed keys first made their appearance on the bagpipe. But, however this may be, in *Mersenne's* time there was in existence an instrument, belonging to that family, whose pipes *Mersenne* informs us "make all the semitones like the organ." It was constructed on a system of closed keys in comparison with which the most elaborate modern clarionet is simplicity itself. The instrument, which was of Italian origin, was called the *Sourdeline*.

Not the least remarkable circumstance in connection with the *Sourdeline* was the way in which the closed keys were constructed; it is no exaggeration to say that they put to shame the keys of the eight-keyed flute as made 200 years later. The lever, instead of working in a groove cut in a knob or projection of the

wood, was placed between plates of metal soldered together so as to form what is technically a box

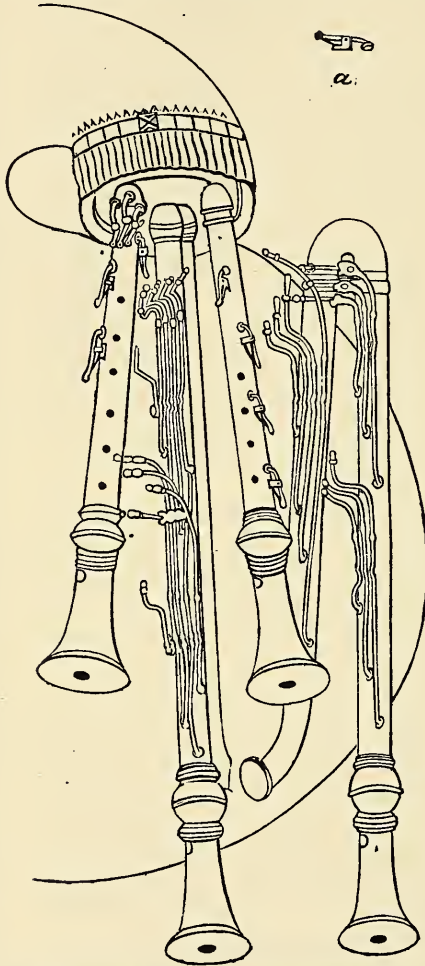


Fig. 27.—Pipes of Sourdeline showing closed Keys (1637).

(*a*, Fig. 27), a contrivance still placed by Messrs. Rudall & Co. on some of their piccolos, but only those of the highest finish.

When Mersenne wrote, it would appear that it was only in Italy where the manufacture of closed keys was understood; for he mentions that a gentleman who had invented an instrument⁵⁰ based on a system of closed keys, having failed to find any one in Germany capable of carrying out his ideas, placed his invention in the hands of Jean Baptiste Ravilius, a maker of Ferrara, by whom his instrument was completed to perfection. The sourdeline had not been introduced into France, and so Mersenne, to enable his countrymen to construct others like it, "because the said keys are difficult to understand on the pipes," gives a drawing of one separate from the instrument; indeed, so minute is his description, that he does not omit to mention the little piece of sheepskin which was to be glued to the flap to secure a good stop.

In Mersenne's time the German flute, though well known, was not so much in favour as the *flûte douce*, or English flute, yet this writer, with the extraordinary acumen of which he gives so many proofs,⁵¹ seems to

⁵⁰ This instrument appears to have been a sort of bassoon of unusual compass downwards, blown, like a bagpipe, with bellows. The following is an extract from Mersenne's description of it:—

"Il est composé de deux Bassons, dont les trous se ferment par des ressorts, que l'on ouvre avec les doigts, comme ceux dont j'ay parlé dans l'explication des instruments precedens: et que l'on use de deux soufflets, ou plustot de deux peaux, dont l'une est accommodée à un soufflet, comme celle de la Musette, ou de la Sourdeline, que l'on met souz le bras droit, et l'autre est semblable à la peau desdites Musettes, qui sert pour envoyer le vent dans le Fagot, lequel ne parle point si l'on n'ouvre ses ressorts, comme il arrive à la Sourdeline, que l'on peut mettre entre les Fagots."—*Harmonie Universelle*, Book v. Proposition xxxiii. p. 305.

⁵¹ Mersenne, whose fertility in expedients was inexhaustible, makes suggestions for overcoming the difficulty of manipulating the bass German flute, and such is the tendency of flute-makers to dish up old ideas and serve them as new, that the contrivances he proposed formed the subject of a patent taken out in England in 1810, nearly two hundred years after his time (see p. 76). "As the bass (German) flute," he says, "cannot be made sufficiently long to go

have recognised its superior capabilities, and to have foreseen that it was destined to eclipse its more popular rival. He was not slow to perceive what might be

down low enough, the sackbut, or the serpent, or some other bass is used to take its place; for if the German flute was made long enough to do this part, the hands could not easily be stretched as far as the last holes whilst it was being held to the mouth, although one could supply this deficiency in the basses of the said flute by sundry keys, or by severing or doubling them back, as is done to bassoons."

The sackbut, now called the trombone, appears to have undergone little change, except in name since it was described and figured by Mersenne. It must surely have been ill-adapted to form the bass in a flute quartette. Yet it was so much used as a bass, not only for flutes, but for instruments of other families, that Mersenne states that it had obtained the name of the harmonic trumpet. The serpent, one would think, was still less fitted for the purpose. The anecdote told of Handel, that on first hearing this instrument, he asked in amazement "what de tevel be dat," and that on being told that it was a new instrument termed the serpent, he exclaimed, "Oh! de serbent; but it not be de serbent dat seduced Eve," is no doubt apocryphal, for the serpent was invented long before Handel's time; but it conveys an idea of the repulsive effect of this terrific instrument. So closely did its tones resemble the voice of a calf deprived of its mother, that a west country farmer, who had lost a calf, happening to pass a house in which a person was playing the serpent, was so firmly persuaded that his property was within, that the occupier, for the sake of his own character, allowed him to satisfy himself by searching the premises. Its use in churches roused the indignation of Berlioz, who declared that its "frigid and abominable blaring" was better suited to the sanguinary rites of the Druids than to a Christian service; but he admits that "it seems to be invested with a kind of lugubrious poetry when accompanying words expressive of all the horrors of death, and the vengeance of a jealous God."

It seems, however, that the serpent got the bad name it has left behind through the want of skill of those who played it. The instrument could be as soft and refined as it was coarse and savage. Mersenne says of it, that "though it is capable of sustaining twenty of the loudest voices, it is so easy to play that a child of fifteen can sound it as loud as a man of thirty," but he adds, "its tone can be so subdued that it will be suitable to blend with the sound of soft chamber music, the delicacies (*les mignardises*) of which it imi-

gained by having recourse to closed keys. He taunts the musical instrument makers with the neglect with which they had treated the German flute in comparison with the pains they had taken to improve the organ, and giving the reins to his fertile imagination, suggests that in addition to the holes with which the instrument was already furnished for the diatonic scale, others should be bored, one set for the chromatic, another for the enharmonic genus, and then, he triumphantly exclaims, "one could easily execute all that the Greeks knew with a little piece of wood: but," he adds, "I leave this investigation to the makers."⁵²

tates." Burney, too, who often heard it played in church during his musical tours on the Continent, says, "it is in general overblown, and too powerful for the voices it accompanies; otherwise, it mixes with them better than the organ, as it can augment or diminish a sound with more delicacy, and is less likely to overpower or destroy, by a bad temperament, that perfect one of which the voice only is capable."

⁵² It seems strange that this proposal of Mersenne should not have attracted the attention of modern writers. To show how clearly it was expressed I quote his own words. Referring to flutes, he says: "Si l'on vouloit prendre la peine de les percer tellement, que le genre Diatonic estant d'un costé, comme il est en effet, le Chromatic et l'Enharmonic fussent des deux autres costez, l'on executeroit aysément tout ce que les Grecs ont sceu, avec un petit morceau de bois: mais je laisse cette recherche aux Facteurs, aussi bien que la recherche du Diapason necessaire pour les percer justement, quoy que les precedens monstrent les endroits des trous Diatoniques assez exactement pour en faire d'autres à l'imitation." —*Harmonie Universelle*, Book v. Proposition ix. p. 243.

So full was Mersenne of ideas to which the notion of applying closed keys to the flute had given rise, that he imagined an organ composed of four flutes with all their holes covered with these keys. Each of them was to be pierced with a sufficient number of holes to make nineteen notes, so that the three genera of music should be heard in their perfection. The instrument was to be "so light that any one could carry it as easily as a violin or a lute." The flutes were to be English, not German flutes; each was to be of the compass of an octave, one above another; their heads were to be inserted into a sound-board, and for portability they were to be made in joints.

Now, if the makers, without troubling themselves about the refinements of the Greek intervals, had only bored the five additional holes which were required to enable the flute to "make all the semitones like the organ," the history of the "little piece of wood" with which Mersenne's sagacity had led him to perceive that such great things could be done, would have been shortened by something approaching a century and a half. But though the holy father's words were ringing in their ears, and his drawings were before their eyes,

The way the keys were to be acted on was to be left to the makers, but Mersenne favoured the idea of a little drum, which would "make the diminutions and the cadences with greater exactness and rapidity than the fingers of the most skilful organist." In fact, it was to be a barrel-organ. He describes it as follows :

"J'adiouste maintenant plusieurs choses qui n'ont pas esté remarquées, dont la puisse consiste a faire un Orgue si leger que chaqun le puisse porter aussi aysément que le Violon, ou le Luth : ce qui arrivera si l'on use de quatre Fleutes douces, dont chacune ayt l'estenduë d'une Octave l'une par dessus l'autre, a fin de leur donner estenduë du clavier de l'Orgue, car l'on pourra ouvrir et boucher leur trous par le moyen de petits ressorts doublez de cuir, comme j'ay desia monstré dans le cinquiesme livre des instrumens, lors que j'ay parlé de la Sourdeline, ou Musette de Naples, dans la trentiesme Proposition, et parce qu'elles se peuvent couper en plusieurs lieux, l'on pourra les assembler and les mettre en aussi peu de lieu que le Cervelat, ou l'un des moindres Bassons, dont j'ay traité dans ledit livre.

"Quant au sommier, il suffit qu'il ayt quatre trous pour recevoir les quatre testes des quatre Fleutes ; je laisse le reste à la disposition des Facteurs, qui peuvent user d'un petit tambour, ou barillet, qui fera les diminutions et les cadences plus justes and plus vistes que les doigts des plus habiles Organistes : de sort que le mesme mouvement du tambour levera les soufflets, et ouvrira les soupapes, et les clefs de tous les trous des Fleutes, lesquels on peut faire en si grand nombre sur quatre Fleutes, que chaque Octave aura dix-neuf sons pour faire ouyr les trois genres de Musique en leur perfection : or il seroit plus aysé d'accommoder ces Fleutes au Luth, ou à la Viole, que les autre tuyaux des Orgues."—*Harmonie Universelle*, Book vi. Proposition xxxix. p. 388.

they made no attempt to follow out the investigation he had commended to them. However, after the lapse of thirty or forty years, one of Mersenne's countrymen summoned up courage, and took a step forward. There was one of the five semi-tones for which no wheezing substitute, good, bad, or indifferent, could be found, and for this he had the temerity to construct a closed key. In Fig. 28, which is a drawing of an ebony one-keyed flute belonging to Mr. Snoeck, we see the little stranger. We also observe that the flute-makers, however little disposed they might have been to attend to Father Mersenne's suggestions, were ready enough to make changes of their own. The instrument is no longer in one piece, but is divided into three joints. The head and the middle meet each other within a massive ivory hoop, into a socket in which the pin is thrust. The head, too, is surmounted by an ivory cap, and the pear-shaped foot is composed wholly of that material. Vestiges of this use of ivory have survived till our own time in the tips and ferules with which the flute is sometimes ornamented.

The changes the makers had introduced were not confined to the exterior, nor to the material of the instrument, they were accompanied by an alteration in the bore. In the head the bore still retains its cylindrical form and its diameter of six-eighths of an inch, but in the middle it has begun to taper slightly, the upper end of this joint being a sixteenth wider in the interior than the lower, and it diminishes another sixteenth in the foot,



Fig. 28.—Early One-keyed Flute.



Fig. 29.—One-keyed Flute by Rippert.

thus making a total difference in the diameter of an eighth of an inch.

Fig. 29 is another one-keyed flute, the property of Messrs. J. and R. Glen, on which the new-comer is not constructed of brass, as in the last example, but is honoured with the noble metal silver. In this instrument, which is made of box-wood stained, and bears the maker's name, Rippert, on each of its three joints, ivory is more sparingly used. In Fig. 30 we have a gentleman of the period (angel flautists having become scarce) performing on such a flute.

The introduction of this key, one would think, must have been quickly followed by that of its four brethren, whose presence was so urgently needed. What deterred the makers? They were frightened by an apparition; the spectre of Perfection appeared and raised her threatening arm to stop the way. When an amateur timidly ventured to give expression to the opinion that the instrument placed in his hands was not free from some trifling defects, his professional master, a priest of Perfection, would turn fiercely on him with the crushing reply that it was not for the flute, but for his own fingers and his own lips that Perfection should be invoked; ⁵³ just as, at

⁵³ The following extract will give an idea of the way in which the pupil was addressed by his master:—" . . . in regard to its (the one-keyed flute's) supposed imperfections, they are absolutely founded on false principles, attributing that to the

Instrument, which is in effect y^e want of a good Ear or abilities in the Performer, whose (those?) necessary requisites which only can enable him to make it appear what it really is, and which indeed to



Fig. 30.—Flute-player, from the 'Music Master,' 1730.

the present day, when a sound, the intonation of which offends the ear, is heard to issue from Mr. Rockstro's model, we are told in language, if less *brusque*, certainly not less decided, that the note has been rendered false by unskilful blowing.⁵⁴

Time sped. Half a century had rolled by since the key had seen the light, when the alarming discovery was made that the poor solitary little fellow had given offence to the hobgoblin that haunted the flute. The votaries of Perfection were commanded by the great Quantz to prostrate themselves before their fetish, and to go through the solemn farce of fingering, where it was possible, the buzzing apologies for the semitones which were as yet unprovided with holes, in such a way as to make believe in enharmonic differences; thus the muffled wail which went by the name of B flat was to be fingered differently from the stifled moan called A sharp; the strangled C sharp known as B sharp, from the asphyxiated D flat

attain requires a closer attention than most Persons who undertake this Instrument will bestow on it. But to obtrude these remarks on the Judicious would be an affront to the understanding of those who have already experienced its perfections, and the agreeable sensations it affords in the Hands of a skillfull Performer." This extract is taken from a code of instructions prefixed to a collection of Duets for two German Flutes, published by J. & J. Simpson, Sweetings Alley, Royal Exchange, which cannot have been printed long before the extra keys for the semitones were introduced. The same cry was raised when the perfection of the eight-keyed flute was called in question. "It is not the flute that is at fault," exclaims Old Howling Stick (p. 327), "but the man who sits behind it." In the present day the outpourings of the believers in the old system, who, like the battalions of Kosciusko, are

" . . . few, but undismay'd,"

breathe a spirit of pious resignation. "Lord, forgive them, for they know not what they do," is the prayer of the sorrowful, but not too reverent Terschak.

⁵⁴ *Rockstro on the Flute*, section 367, p. 186; also section 759, p. 446.

styled C natural.⁵⁵ The unhappy key, however, could only make D sharp, whilst Perfection demanded E flat as well.

Quantz came to the rescue of the offender. He appeased the angry spirit by introducing a second key to carry out her behest,⁵⁶ and again the

⁵⁵ See the table of fingering given at the end of Quantz's *Essay*, or *Rockstro on the Flute*, section 436, p. 233. For F natural, one of the four notes for which holes were not provided on the one-keyed flute, no alternative fingering could be found. As regards the three others, A flat was fingered by Quantz differently from G sharp in the second, and C natural from B sharp, and A sharp from B flat, in both the first and the second octave. In the third octave alternative fingerings were not attempted. It will, of course, be understood that the alternative fingerings were not confined to the fork-fingered notes; they were to be used, when possible, in all cases where it was required to distinguish between a major and a minor semitone. Whilst admitting that such theoretical niceties of intonation could not be produced by the harpsichord, on which recourse was had to Temperature (*sic*) or Participation, yet, as they could easily be observed by singers and performers on instruments played with the bow, Quantz maintained that it was only right that they should be expressed on the flute. It should be mentioned that Quantz was not the first to propose alternative fingerings. In a table of fingering for the one-keyed flute, published by Louis Hotteterre in 1699, more than fifty years before Quantz brought out his essay, G flat was fingered differently from F sharp, and D flat from C sharp.

⁵⁶ The *naïveté* with which Quantz informs his readers that, as he learnt by little and

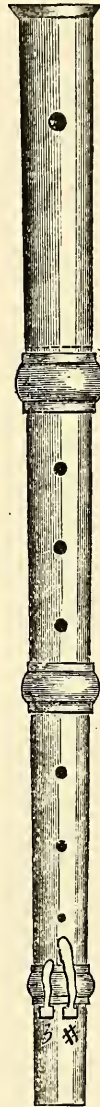


Fig. 31.—Flute of Quantz showing separate Keys for D♯ and E♭, enlarged from the Drawing in his Essay.

tyrant reigned supreme. However, after wielding the sceptre till the last two decades of the eighteenth century were drawing near, Perfection yielded, and the four other closed keys necessary to enable the "little piece of wood" to "make all the semitones like the organ" were allowed to take their places on the instrument.⁵⁷ But still the ghostly voice was not silenced; to this day Perfection continues to force from time to time her fitful accents on the ear, but her cry, like the song of the banshee, is ill omened; it tells of the death of progress and improvement.

But we are forgetting our trial. The Court is sitting, the libellers of Boehm are at the bar, and Mr. Rockstro is in the witness-box.

The closed keys held their own for about sixty years, when they were called upon to make way for their open-standing successors. There are two principles which underlie the Boehm system: one that the holes should be fairly equal in size, the other that the keys should remain open when not in use. The Boehm flute did not

little to understand the nature of the flute, he discovered that there was still a trifling defect ("un petit défaut") to be found in this otherwise immaculate instrument, is truly charming (ch. i. 8). Writing twenty years after he had remedied this defect by means of his second key, he is puzzled to account for the circumstance that his invention had not come into general use. Either its utility, he thinks, cannot have been recognised, or else players were dismayed by the difficulty it involved—a difficulty which he takes the trouble to prove to be little more than imaginary (ch. iii. 9). What would he have said had he known that flute-players were destined to encounter the difficulties of eight, and even fourteen keys? As for the Boehm fingering, it would make him turn in his grave.

⁵⁷ The precise date of the application of these keys to the flute is involved in obscurity, nor is it known with certainty by whom they were introduced. The subject is discussed by Mr. Victor Mahillon (*Encyclopædia Britannica*, ninth edition, art. *Transverse Flute*), and by Mr. Rockstro (*Treatise on the Flute*, sections 452, 455, pp. 243, 245).

see the light until 1832, but in the year previous Captain Gordon made his appearance in London with a flute on which he had attempted to carry out both of these principles. Gordon then was in the field before Boehm. So Clinton, who only knew of three "palpable" flute-improvers, Nicholson, Gordon, and Boehm, jumped to the conclusion that it was the "sagacity" of Gordon that "laid the foundation" of these principles, which he believed to be new.

We have just seen how ill-founded was this assertion as far as regards the rearrangement of the holes, but was it true in relation to the idea of an open-keyed system? Turning to Mr. Rockstro, we elicit from him, in answer to this question, that it was not to Gordon, but to Tromlitz, who died in 1805, twenty years before Gordon took up the subject of flute reform, that "we are perhaps more deeply indebted than to any other flute-constructor for the excellent system of open keys now in vogue, as it was he who first conceived the idea of extending the application of the open finger-holes of the primitive diatonic flute to the chromatic one of more recent times."⁵⁸

The idea, then, of the open-keyed system was not originated by Gordon. Nor was it through Gordon that Boehm became acquainted with this idea. We have only to look at the drawing of his first model (Fig. 17, p. 206) to see that he had already opened one of the keys, that for F natural, on the flute he showed Gordon when he came to call upon him; a circumstance which gives us an insight into his meaning when he told him, in the conversation which took place on the occasion, that it was his intention to endeavour, on his return to Munich, to construct an improved flute. The task he had to accomplish was to extend to the whole of the flute the two principles, the equalisation of the holes and the opening of the keys, which he had already in his

⁵⁸ *Rockstro on the Flute*, section 842, p. 551.

first model applied to a part of the instrument. The mechanism by means of which he succeeded in carrying out his undertaking will be treated of when we come to the fifth count of our indictment.

Fourthly, *the fingering of the Boehm flute.*

How many times has Boehm been charged with copying his fingering from Gordon, but how few of those who have heard the statement repeated again and again have taken the pains to ascertain for themselves how far it can be sustained!

To render a comparison easy I will place together in a tabular form the fingering of each note on the two flutes in the first register from C¹ to C^{♯2} and leave the reader to judge for himself what foundation there is for Coche's assertion that these two instruments, though they differ in mechanism, have the same fingerings.⁵⁹

⁵⁹ "Il faut observer que ces trois instrumens [Gordon's, Boehm's, and Coche's] différents quant au mécanisme ont d'ailleurs les mêmes doigtés." This appears on the title-page of Coche's *Méthode pour servir à l'enseignement de la nouvelle Flûte, Inventée par Gordon, modifiée par Boehm et perfectionnée par V. Coche et Buffet &c.*

Mr. Rockstro would pin Clinton to a statement almost as misleading by quoting the following passage:—"To take a general view of the subject, we find, practically, there are but two systems of fingering in existence—that of the old eight-keyed flute, and that of Gordon, known in this country as the Boehm flute."⁵⁹ Had Mr. Rockstro only continued and finished the sentence, he would have allowed Clinton to make his meaning clear, for he adds, "the former being on the *shut* and the latter on the *open*-keyed principle." The open-keyed principle, it is needless to say, admits of an infinite variety of fingerings. There is Gordon's fingering, Boehm's fingering, Carte's fingering, Radcliff's fingering, all on this principle, and the list could be doubled.

Clinton never intended to assign to Gordon the credit of the Boehm fingering, as the following from the same pamphlet (*A Few Practical Hints to Flute Players*) shows:—"Mr. Boehm made a step in the right direction by following up Gordon's plan of equal size and distance in the arrangement of the holes; by those means he rendered the instrument infinitely superior to the *old* flute. His system of fingering, too, is by far the best for *open*

	C	
	is fingered by	
BOEHM		GORDON
By putting down the little finger of the <i>right</i> hand.		By putting down the little finger of the <i>left</i> hand.
	C #	
By putting down the little finger of the <i>right</i> hand.		By putting down the little finger of the <i>left</i> hand.
	D	
By <i>taking up</i> the little finger of the <i>right</i> hand.		By <i>putting down</i> the little finger of the <i>right</i> hand.
	D #	
By <i>putting down</i> the little finger of the <i>right</i> hand.		By <i>taking up</i> the little finger of the <i>right</i> hand.
	E	
As on the old flute.		As on the old flute.
	F	
		Taken by Gordon from Boehm.
	F #	
		Taken by Gordon from Boehm.
	G	
By <i>putting down</i> the little finger of the <i>left</i> hand.		By <i>taking up</i> the little finger of the <i>left</i> hand.
	G #	
By <i>taking up</i> the little finger of the <i>left</i> hand.		By <i>putting down</i> the little finger of the <i>left</i> hand.
	A	
As on the old flute.		As on the old flute.
	B b	
By putting down the first finger of the <i>right</i> hand.		By putting down the first finger of the <i>right</i> hand.

keys that has ever appeared ; still we should not allow admiration for his efforts to blind us to the shortcomings of his instrument."

So violently opposed was Clinton to the open-keyed system that he wrote, "The conclusion I have drawn from the end of my labours is, that no other system than the shut-keyed can ultimately succeed, while any attempt to improve the open-keyed must end in disappointment and failure."

BOEHM.

GORDON.

B

By putting down the left thumb. By putting down the left thumb.

C

By taking up the left thumb. By taking up the left thumb.

C #

As on the old flute. As on the old flute.

It will thus be seen that when we take away those notes which are fingered as their representatives on the old flute, and those for the fingering of which Gordon acknowledges that he is indebted to Boehm, there remain but three out of the fourteen which are fingered in the same way by Boehm and Gordon, and Mr. Rockstro has furnished us with evidence that two out of these three fingerings (B natural and C natural fingered with the left thumb) were not new ;⁶⁰ thus leaving one only (B flat fingered with the first finger of the right hand), which cannot be shown not to have been originated by Gordon.

Fifthly, *the ring-keys*.

We now come to the last and incomparably the most important point, the ring-key introduced to the world by Boehm. To say that the inventor of this ring-key was the inventor of the Boehm flute would, of course, be an exaggeration ; but to the inventor of this ring-key undoubtedly belongs the credit of making the Boehm flute a possibility. Boehm, it is true, makes light of the invention: it is easier, he says, to invent keys than to improve notes. Never did a man make a greater mistake. It might have been easier to him, for he was a born genius as an inventor, and to him, as he has told us, his inventions seemed to be mere trifles which did not occur to the minds of others at the right moment. But the inventive faculty is a rare natural gift.

⁶⁰ *Rockstro on the Flute*, sections 564, 565, pp. 308-9.

Long before Boehm's time Tromlitz and others had improved notes, but they had all failed to reform the instrument because they could not invent keys. The problem was how to enable nine fingers to act on eleven holes, and the problem was solved by the invention of this ring-key. To show that the charge brought against Boehm of taking the idea from Gordon was as false as it was defamatory, we have only to appeal to our touchstone, Boehm's first model (Fig. 17, *b, c*, p. 206), where we find it in existence before he had seen that gentleman. How then did this ring-key originate?

When I first interested myself in this inquiry two views of its origin were entertained: the Boehmites declared it to be an original invention of Boehm, whilst the Gordonites were equally positive that it was a modification of Gordon's crescents. It occurred to me, when I was putting together the materials of this book, that possibly both of the disputants might be mistaken; and I set to work, as already narrated in these pages, to endeavour to ascertain whether any traces could be found of the existence of ring-keys before Boehm or Gordon appeared on the scene. My efforts, however, proved fruitless, and I was on the point of giving up the search, when I bethought me of a sepulchre of invention, where rest in peace the countless offspring of projectors' brains—the Patent Office.

In this charnel-house of ingenuity, haunted by the lingering shades of dreams of wealth and fame, the lifeless forms of the progeny of genius, encoffined in portfolios, and entombed like the Mauleverers upright, sleep in their blue shrouds in thousands. Thither I repaired, and I had not gone far with the task (no pleasant one) of disinterring them from the unstratified deposits of soot and dust beneath which they were so deeply buried,⁶¹ when there came to light a ring-key in

⁶¹ In justice to the authorities, I ought to say that the place has now (1891) been properly cleaned.

its very inception ; a ring-key which had fallen unnoticed from the womb of talent, immature and still-born.

More than eighty years ago a clergyman in deacon's orders conceived the daring design of taking out a patent for certain improvements in the construction of finger-holed instruments, "whereby," to use his own words, "they receive greater Truth of Tone, and give more Facility in Playing the Flat and Sharp Notes, than is produced by such Instruments now in Use." This ambitious young flute reformer, who was the last surviving head of an old family, afterwards became a distinguished personage in the world of theology and letters ; indeed we learn from his epitaph that he was "endued with intellect of the highest order, adorned with learning of rarely equalled extent, and distinguished by every virtue which could adorn the Christian minister, the husband and the friend." Yet, such is the irony of fate, his youthful exploit, the invention of a key for the flute, bids fair to be remembered long after his learning, his piety, and his social virtues are forgotten.⁶²

In order to enable the finger which plays "the regular diatonick note" to act on "the acute semitone" of this note, Doctor, then Mr., Nolan proposed to cover the

⁶² Frederick Nolan was born in Ireland in 1780 or 1781. In 1796 he was sent to Trinity College, Dublin. In 1803 he entered as a Gentleman Commoner at Exeter College, Oxford. He was ordained deacon in 1806, and priest in 1809. In 1828 he took the Oxford degrees of B.C.L. and D.C.L. by accumulation. He was Boyle Lecturer in 1812-15, Bampton Lecturer in 1833, and Warburton Lecturer in 1833-37. He was elected a member of the Royal Society of Literature in 1828, and of the Royal Society in 1832. He was also an honorary member of the Statistical Society of Paris. In 1822 he was presented to the Vicarage of Prittlewell, in Essex, and he retained it until his death in 1864. The titles of fifteen of his principal published works will be found in the *Gentleman's Magazine* for 1864, vol. ii. p. 788. He left a mass of manuscripts on important subjects which were to be offered to the Trustees of the British Museum.

hole for this semitone with the valve of an open-standing key, and to place the tail or touch of this key over the hole for "the regular diatonick note." In the touch a perforation was to be made (*e*, Fig. 32) through which the diatonic note could issue when the valve, which closed the hole for the acute semitone, was pressed down (*g*, Fig. 32). What remained of the touch after the perforation was made assumed the form of a ring (*e*, Figs. 32 and 34).

Now Mr. Rockstro, who has followed me to the Patent Office, satisfied himself of the correctness of my

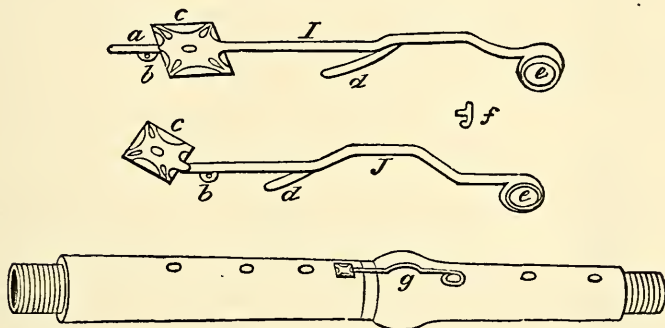


Fig. 32.—Nolan's Perforated Key, after the engraving in the published specification of his patent.

account of Dr. Nolan's invention, and has repeated in his *Treatise on the Flute* the quotation given in this work from the specification of his patent, is of opinion that the perforated key of Nolan is the veritable embryo from which the ring-key, such as it appeared on the Boehm flute, was developed; so that, if he is correct in his judgment, this invention has been here traced to its birth, and even caught in the very act of its conception.

A glance at the drawing will show that the performer, on placing his finger on the perforation in the key, would close, by one and the same movement, two holes. But

in order to virtually increase the number of the fingers, he must be able to close them not only together, but separately. This Dr. Nolan endeavoured to accomplish in the following way: when the player had occasion to close the valve whilst leaving the uncovered hole open, he was required, either to place his finger on the shank of the key, above the perforation, or else to fasten down the key with a catch *f*. The catch worked on a pin passing through a small hole shown in Fig. 33.

Unfortunately, Dr. Nolan was too much occupied with his studies as a scholar and a divine to make



Fig. 33.—Nolan's Catch.

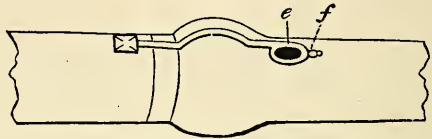
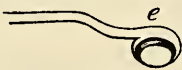


Fig. 34.—Portion of Nolan's Flute.

himself a master of the *technique* of the art of drawing, so that it is not easy to say with certainty what he intended to portray in his design, as it is represented in the printed specification of his patent. However, on adjourning from the Patent to the Record Office, and causing to be unrolled the parchment cerements which enveloped this supposed progenitor of the ring-key, and Dr. Nolan's own drawing to be brought to light, the catch appeared *in situ*, as it is represented in Fig. 34. There are also indications which give reason for believing that the Reverend inventor intended to show that the ring, when pressed down, was sunk in the substance of the wood,⁶³

⁶³ Dr. Nolan directs that his perforated key should be so bored through the touch as "to be completely stopped by the finger which presses the key down," but he omits to state how the stopping is to be effected. To an expert as a draughtsman it would seem that at *e* (Fig. 32) the doctor intended to depict the under surface of the perforation in his key, and that he wished to show that it was furnished with a groove as here represented.



and it will be seen that on moving the finger slightly sideways, the catch would be pushed aside, and the key released.

Now it was in the means thus adopted for conferring this power of closing the two holes one without the other that Dr. Nolan failed. The reason is obvious. No player would have time in a rapid passage to release a catch, or to slide his finger from a hole to the shank of a key.

This difficulty was surmounted in the simplest of simple ways, by repeating Dr. Nolan's own idea: by abolishing the catch and substituting for it a second perforated key, acted on by another finger, to do the catch's work. Fig. 35 shows such a piece of mechanism as it appeared on Boehm's first model; *c* representing the first or original perforated key, and *b* the second added to take the place of the catch.⁶⁴

To whom did this happy thought occur? Surely so ingenious an idea could not have been originated by the benighted intelligence of the "ignorant impostor." Yet Mr. Rockstro expresses the opinion that Boehm copied Nolan's key.⁶⁵ But if he copied it, who but he introduced the second perforated lever? Thus our Balaam, whilst cursing Boehm by branding him with the stigma of copying another man's invention, assigns to him the credit of making this great advance in the construction of the ring-key.

But the ring-key was not yet complete. In the form in which it appeared on Boehm's first model its use was

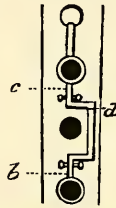


Fig. 35.—Boehm's First Ring-key.

⁶⁴ In the original drawing the draughtsman has omitted to indicate the junction of the two levers. In the engraving, for the sake of illustration, it has been placed at *a*, but it was probably somewhat lower down.

⁶⁵ *Rockstro on the Flute*, section 593, p. 330.

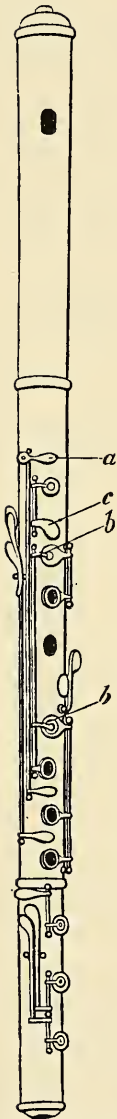


Fig. 36.—Boehm
Flute of 1832.

still limited ; in order to make it available for general purposes it was necessary that the jointed lever should be replaced by an axle. The account Mr. Rockstro gives of the introduction of the axle is that Boehm, not being satisfied with the ring-key thus made with jointed levers on his first model, "contrived the now discarded mechanism"⁶⁶ of the ring-key as it appeared on the Boehm flute of 1832 (Fig. 36). In this mechanism, so scornfully described as discarded, was the axle ; but the axle, so far from being discarded, is in universal use to this day. It is not the axle which has been discarded, but the appendage to the axle, the arm *b* (Fig. 36), which has been superseded by the clutch invented by Buffet.

If, then, we are to accept Mr. Rockstro's version of the history of the ring-key, this invention was originated by Nolan and completed by Buffet ; but we must admit that the two most important contributions, the second ring and the axle, owe their existence to the ingenuity of Boehm.

I have now passed in review the five accusations brought against Boehm. I have pointed out that when examined by the light of evidence the validity of which Mr. Rockstro does not dispute, they can be shown, with the exception of the fingering of a single note, to be devoid of foundation. Whether Boehm did or did not get the idea of the fingering of this note (B flat) from Gordon is a question to which we have no means of returning a satisfactory answer. It will, of course, be under-

⁶⁶ *Rockstro on the Flute*, section 607, p. 340.

stood that Coche and Clinton (unless we feel bound to except certain of Coche's statements⁶⁷) are not charged with wilful and deliberate falsehood ; their crime—for it is a crime—was that they allowed jealousy of Boehm to convert their ignorance into a cloak for maliciousness, and accused him of stealing from Gordon ideas of the origin of which they had no knowledge.

It is to Mr. Rockstro that Boehm is chiefly indebted for clearing his character, as it is he who has dispersed the mist which enshrouded that period of the history of the flute, which immediately preceded the time when Boehm and Gordon appeared on the scene. It is therefore not without interest that we ask what part of his flute, irrespective of the B flat key just mentioned, Mr. Rockstro believes Boehm to have copied from Gordon. We ask, but we ask in vain. Will it be credited that when we interrogate him on this point, the answer we get from his book is, "much." The man who holds up Boehm to scorn and detestation as having invited Gordon to his house to rob, deceive, and lead him astray, shelters himself behind the indefinite "much."

Can we imagine a person going into a court of justice to prefer a charge of stealing, and when placed in the witness-box and called upon to state what had been stolen, proceeding to ejaculate "much"? The judge would instantly tell him that if he were treated according to his deserts he would be transferred to the dock and committed to prison for instituting so frivolous, vexatious, and malicious a prosecution ; unless, indeed, he came to the charitable conclusion that his head was affected, and

⁶⁷ I have already drawn attention to Coche's statement respecting the identity of the fingering of Boehm and Gordon. Another of his assertions seems, if possible, still more difficult to reconcile with a due regard for veracity. Whilst professing to be engaged in fulfilling the duty he owed to himself "to ascertain the truth" he attributes to Boehm words which not only had he never used, but which bear a meaning precisely contrary to that of those he had really written. See his attack on Boehm, p. 125, note 3.

that he ought to be placed under medical care. In any case there is a bar to which he could not escape being brought, and that is the bar of public opinion.

Perhaps it might be of interest, as a psychological study, if we were to trace the mental process by which Mr. Rockstro has been brought to the belief that Boehm did copy "much" from Gordon. Our universal genius, having exhausted the resources of science and history, has had recourse to logic. But logic is a dangerous art to play with; a man who invokes its aid to throw dust into the eyes of others may unexpectedly find that he has blinded himself. Thus the modern Balaam having duly saddled and mounted his logical animal, is unable to see the Angel of Truth who is standing in the way, with his sword drawn in his hand, to bar the poor ass's passage.

To give his logical steed a preliminary canter, Mr. Rockstro puts her through the following syllogism:—

Gordon loyally acknowledged everything that he borrowed from Boehm;

Gordon did not acknowledge that he borrowed anything from Boehm but the key for closing the G natural hole;

Therefore Gordon borrowed nothing else from Boehm.

Nothing could be more decisive than this brilliant logical *tour de force*; but unfortunately, as a matter of fact, Gordon did borrow another key, in addition to this, and, as I will show further on, loyally acknowledged his obligation to Boehm.⁶⁸

⁶⁸ See *infra*, p. 271. Not only did Gordon borrow these two keys from Boehm, but, following Boehm's advice, he adopted for the most part the position of the holes of his (Boehm's) flute. So says Boehm in his letter to Coche, and he repeats the statement in his book of 1847. Mr. Rockstro, however, declares this assertion to be "so opposed to all trustworthy evidence at our command that it may be dismissed without further comment" (*Treatise on the Flute*, section 608, p. 341), and he adds, "this statement of Boehm's has been expunged in the English translation of his book." In

Mr. Rockstro now plunges into his argument to prove that Boehm borrowed "much" from Gordon. This argument is based on two assumptions; one, that what Gordon borrowed from Boehm was but little, although Boehm declares it to be an essential part of his invention; the other, that there is a close resemblance between Gordon's flute and Boehm's "in the general principles of their construction and fingering," whereas nine men out of ten would say, on comparing the two instruments, that the difference was greater than the resemblance.⁶⁹ With such statements as premisses Mr. Rockstro proceeds with his reasoning, but when we expect him to bring forward another sweeping syllogism, our logician suddenly climbs down, and throws his conclusion into the form of a humble enthymeme, thus: "As Gordon obviously borrowed little from Boehm, much must have been borrowed by Boehm from Gordon."

dismissing the assertion without comment, Mr. Rockstro has exercised a wise discretion, for, had he commented on it, he could scarcely have avoided saying whether there is, or is not, in existence one scrap of evidence, trustworthy or untrustworthy, beyond Boehm's assertion. Ward informed Mr. Rockstro that the position of the holes of the flute he made for Gordon was determined by the divisions of the monochord (*Treatise on the Flute*, section 599, p. 335). Seeing that Mr. Rockstro, as I have already mentioned (note, p. 186), states that this method is fallacious, to me, I confess, it does not seem improbable that Gordon when, having ceased to employ Ward, he was working in Boehm's factory, should have taken Boehm's advice as to the position of the holes of his flute.

As regards the alleged expunging in "the English translation" of Boehm's book, the book in question has been translated into French, but no English translation of it has ever appeared. The *Essay on the Construction of Flutes*, which Mr. Broadwood edited, is not a translation, but an English version of the work, altered and abridged by Boehm himself. It is certain that the expunging process has not been resorted to by Mr. Broadwood, for no such words as those stated to have been expunged appear in the manuscript.

⁶⁹ The two instruments are figured side by side at p. 273.

Why does the mountain in labour, instead of thundering forth a syllogism, and shaking the earth beneath our feet, quietly usher into the world the *ridiculus mus* of an enthymeme? For a very good reason. An enthymeme, it is needless to mention, is a syllogism with one premiss suppressed, and Mr. Rockstro's major; which he here suppresses, is false. It is assumed (this being assumption number three) that instruments between which there is a close resemblance, must be copied one from the other; a proposition which it is as impossible to establish, as it would be to prove that one pea is copied from another, because two peas are alike. The various pianofortes, on so many different systems, closely resemble each other in "the general principles of their construction and fingering"; but the fingering of the pianoforte was in use, and the general principles of its construction carried out on the clavichord, the spinet, and the harpsichord long before the hammer was introduced into the instrument. Both Gordon and Boehm took up and added to the ideas of the flute reformers by whom they were preceded, but if Gordon contributed even so much as a link to the chain of ideas which led up to the Boehm flute, the secret has perished with Boehm. The attempts to identify such a link have failed, as we have seen, even when made with eyes sharpened by jealousy and self-interest. It is far more illogical and a greater abuse of language to call the Boehm flute Gordon's, than it would be to assert that a Broadwood pianoforte was a Cristofori, an Erard a Broadwood, or a Chickering an Erard.⁷⁰

⁷⁰ The following is Mr. Rockstro's argument *in extenso* :—"Now if Gordon had acknowledged having made use of any contrivance of Boehm's, besides the one in question (the F sharp key), it is not reasonable to suppose that Boehm would have suppressed the information; therefore we have the following syllogism: Gordon loyally acknowledged everything that he borrowed from Boehm. Gordon did not acknowledge that he borrowed from Boehm any-

We are too prone to forget how complex a thing is mechanical invention. Inventions are not brought into existence like the Goddess Minerva who leaped, full-grown and armed, from the head of Jupiter, when Vulcan cleft his pregnant skull ; they spring from the efforts of many minds, and come into being by a process of evolution. The inventor is not necessarily the originator of the ideas crystallised in the thing invented ; he is the man whose master-mind welds these ideas together, and reduces them to a practical form. In his endeavours to accomplish the purpose he has in view, he, like the poet and the musician, seeks for ideas from without as well as from within. Behind him there may, and often do stand, seen or unseen, known or unknown, many experimenters, designers, and suggesters, and it is almost always difficult, and sometimes quite impossible for even a bystander, much less a stranger, to ascertain the source from which the inventor's ideas spring. I will give an instance.

The mechanism of the flute known as the 1867 patent is the invention of Mr. Richard Carte. In 'Musical Opinion' of January 1, 1890, Mr. Benjamin Wells, writing, I have not the slightest doubt, in the most perfect good faith, states as follows :—"In the year 1867, Mr. George Spencer, an amateur flautist who took a deep interest in flutes and flute-players, and more particularly,

thing but the idea of the key for closing the G natural hole. Therefore Gordon borrowed nothing else from Boehm.

"It is clear that in the construction of his flute Gordon freely adopted the ideas of his predecessors, and it is equally clear that it was not to Boehm that he was indebted, except in the instance above mentioned, and considering the close resemblance between the two flutes in the general principles of their construction and fingering, it may be further argued, irrespectively of the direct evidence on the subject, that as Gordon obviously borrowed little from Boehm, much must have been borrowed by Boehm from Gordon."—*Treatise on the Flute*, section 605, p. 338.

being an engineer, in the mechanical construction of the instrument, suggested that the complicated mechanism necessary for the long F natural key (played with the little finger of the left hand) might be dispensed with by doing away with the hole on that side altogether, and making another, to be played with the first finger of of

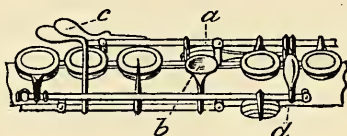


Fig. 37.—Development of Carte's '67 Flute (No. 1).

the right hand. This was done, and the 1867 patent sprang into existence." This instrument, then, should be called, not the Carte, but the Spencer flute. Yet, as a matter of fact, it was not from Mr. Spencer that Mr. Carte derived the idea of how to dispense with the complicated mechanism necessary for the side-hole by doing away with this hole and making another at the top, but from your humble servant. This idea, instead of being elaborated in the brain of an engineer, originated

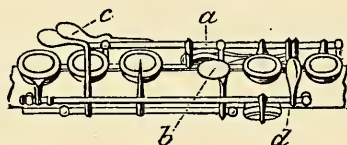


Fig. 38.—Development of Carte's '67 Flute (No. 2).

in the fortuitous circumstance that I once accidentally injured my right forefinger.

In Mr. Carte's flute of 1851, a portion of which is represented in Fig. 37, the hole referred to (*a*) was placed by Mr. Carte at the side of the flute because there seemed to be no room for it on the top, the place required for it being occupied by the finger-plate *b*; the idea of placing one key over another, simple as it

seems when once thought of, never having occurred to him. I played at one time on Carte's 1851 flute, and for the accommodation of my damaged digit, I had this finger-plate *b* raised up as represented in Fig. 38.

It now became apparent that another hole with its key could be placed under the upraised finger-plate, and accordingly I designed for my own use a flute as represented in Fig. 39, in which amongst other changes the hole *a* was thus placed, the complex mechanism, necessary when it was at the side, abolished, and a

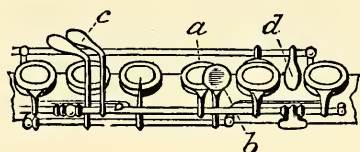


Fig. 39.—Development of Carte's '67 Flute (No. 3).⁷¹

better action secured, although the long F natural key *c*, now brought across the flute, was still retained.

This was in October 1865. I have before me the drawings I drew at the time for Messrs. Rudall & Co.'s

⁷¹ The axle on which the valves for covering the E, the F natural, and the F sharp holes work is here brought over to the side of the instrument opposite to that on which it was placed on Carte's 1851 flute. The object of this change was to enable me to carry the action upwards, and so to establish a connection with the valve covering Carte's open D hole. This arrangement enabled me to make C sharp with either the second or the third finger of the right hand, and so to dispense when I pleased with the use of the third finger of the left hand for the purpose, and thus to get over what was to me the chief drawback to the use of that valuable invention the open D, the work it throws upon the third finger, this finger being in the majority of persons ill adapted, from an anatomical cause, for independent action. The closed F natural key *d*, with its hole, is also brought to the side of the flute opposite to that which it formerly occupied, but only to avoid the disadvantage of having three axles together on one side. Its action is precisely the same as it was before, and the axle is carried up to make B flat as on Carte's flute.

workman, James Collins by name, who made the flute, and they bear this date. On my bringing this plan for placing the side hole at the top, under the finger-plate, to the notice of Mr. Carte, he at once gave orders for a flute to be made for himself with this change carried out; but of the origin of the idea of substituting a second finger-plate for the long F natural key, and of the other changes brought about in the 1867 flute, as represented in Fig. 40, I know nothing.

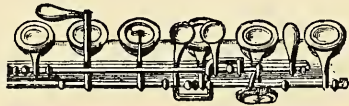


Fig. 40.—Development of Carte's '67 Flute (No. 4).

On the subject of mechanical invention Boehm has made remarks which are so well expressed and so appropriate, that I make no apology for quoting them. "If it were desirable and possible," he says, "to analyse all the inventions that have from time to time been brought forward, we should find that in scarcely any instance were they the offspring of the brain of a single individual, but that all progress is gradual only; each worker follows in the track of his predecessor, and eventually perhaps advances a step beyond him. I was myself," he adds, "never at a loss for an idea, and have often helped others onwards towards success; it depends frequently on some mere trifle, which may not occur to a man's mind at the right moment."⁷²

We have now disposed of the charges brought against Boehm of stealing Gordon's ideas. We have seen Mr. Rockstro driven from point to point by the evidence of facts which he has himself been the means of bringing to light, until at last he was forced to fall back on sophistry as weak and hollow as it was transparent.

⁷² *Essay on the Construction of Flutes*, p. 53.

We shall next find him blackening the memory of the Munich inventor by confounding fact with fiction and allowing himself to accept as an actual occurrence a figment evolved from the inner consciousness.

Let us return to our historical narrative. We left Gordon in London calling upon Boehm to consult him about his flute. We saw that Boehm promised to make a flute for him, and also that he informed him that it was his intention on his return home to construct an improved flute.

We have no information which will enable us to fix the date of Boehm's departure from London. The last concert at which he is reported in 'The Harmonicon' to have played was Hummel's which was given on the 20th of June. If he followed the example of the majority of the foreign artists who visit our shores, he left London at the close of the season, and this would bring him back to Munich in July, August, or September.⁷³ On his return he tells us, he immediately set to work, and in the following year (1832) his new flute was finished.

We hear nothing more of Gordon until 1833. On the 15th of February of that year he wrote to Boehm reminding him of his promise to make a flute on his model, and referring to the improved flute Boehm had told him he intended to try to construct on his return home.⁷⁴ In his reply Boehm suggested that Gordon should come to Munich, and superintend in person the fabrication of his instrument. Gordon came, and Boehm placed at his disposal a small private room in the upper part of his dwelling, and gave up to him his best workman.

Now comes an important question. When Gordon reached Munich, was the flute Boehm had told him that

⁷³ Since this was written, Boehm's passport has come to light. It shows that he passed through Strasbourg on his way home on the 8th of September.

⁷⁴ The letter will be found at p. 95.

he intended to make on his return home, constructed, or was it not? Boehm, as we have seen, was not only acquainted with the two principles which underlie the invention, the opening of the keys, and the equalisation of the holes, but had already in his first model, made in London, applied these principles to the right-hand part of the flute. It cannot be said that he had not had ample time for carrying out his project; there was what remained of 1831, the whole of 1832, and the early part of 1833. That during this period he had completed his flute, we have not only his own testimony, but that of Professor Schafh utl who was on terms of intimacy with him, and informs us that he was an eye-witness of his "innumerable" experiments.

But in deciding the question we are not dependent solely on the testimony of Boehm and his friend Dr. Schafh utl. We have evidence from other sources. 'The Harmonicon,' mentioned above, was a monthly musical periodical which was published in London from 1821 to 1833. It had a correspondent at Munich who chronicled and expressed his opinion upon the chief musical events of that city, his criticism being distinguished by intelligence, judgment, and discrimination. He began to contribute to 'The Harmonicon' soon after it was established, and continued to do so up to the time it ceased to appear. In the August number, 1833, after noticing a performance of Handel's 'Alexander's Feast' and the *d but* of a singer in 'La Gazza Ladra,' he went on to say, "The Royal *Hofmusikus* B hm has, by his great mechanical talents, given such perfection to the flute, that all the tones of the instrument are rendered equally full, pure, and vibrating. Its *pianos* are uncommonly sweet and delicate, and the *fortes* exceed by far the power of an ordinary flute. In addition to these advantages, this new instrument presents an equal facility in all the keys, the most difficult not excepted. Although Mr. B hm has only practised this new instrument for about six months, his execution

on it is almost as great as on the flute hitherto in use.⁷⁵ He is on the point of setting out on a professional journey to England."

Now, if we trace the statements here made to the source from which, as there can be but little doubt, the Munich correspondent of 'The Harmonicon' derived his information, we find that they were published at Munich three months before they found their way to the pages of 'The Harmonicon' in London. They appeared in a periodical entitled 'Der Bazar,' edited by M. G. Saphir. In the issue of Thursday, April 25th., 1833, there was a report of a grand vocal and instrumental concert, given at the Odeon. The report was signed with the letter P, the initial of the *nom de plume*, Pellisov, of Dr. Schafhäütl.⁷⁶ The concert, which opened with the first movement of Beethoven's symphony in D major, was arranged by Herr Treichlinger, a violin artist, who was the conductor of the orchestra of the "Theater an der Wien," at Vienna. The following is a translation of an extract from the report:—

"Variations for the newly invented flute of our excellent Böhm concluded the first part of the concert. Böhm has succeeded, thanks to his extraordinary talent

⁷⁵ This paragraph gives Mr. Rockstro a fine opportunity for the display of his imaginative powers, and for showing his faith in the credulity of his readers. To admit that the instrument on which Boehm was playing in the spring or summer of 1833 was the Boehm flute would be fatal to his contention that at this time Boehm was engaged in leading Gordon "off the scent" in order to appropriate his invention. He would therefore have us believe that the instrument, here referred to as new, was not the improved flute Boehm told Gordon he was going home to construct, but Gerock & Wolf's flute, which he had made in London in the year 1831, two years before this time. Unfortunately for Mr. Rockstro's prolific imagination, the writer of the account, from which the Munich correspondent of *The Harmonicon* appears to have derived his intelligence, mentions that the new instrument involved a total change of fingering, whereas, in Gerock and Wolf's flute, Boehm's object was to reform the holes, and yet "to retain as many notes in the old way of fingering as seemed feasible" (see p. 85).

⁷⁶ See *infra*, p. 35, note 3.

for mechanical devices in so remodelling the flute, this the most delicate and feeble of all orchestral instruments, that it will henceforth rank with the most perfect of wind instruments. The tones of this new instrument are all equally full, clear and strong: they are, moreover, very soft in *piano* passages, and give at least thrice as powerful a *forte* as the ordinary flutes. The new flute, although its fingering differs totally from that of the old, can be easily played, it being consistently constructed, and rendering the most difficult scales easily manageable. These flutes, as well as the Tromlitz flutes, manufactured in Böhm's workshop, are remarkable for their elegance, all of them being constructed according to the principles of mechanics. They are therefore as skilfully made as are mathematical or astronomical instruments. Although Herr Böhm has been practising on his new flute for barely six months, he has already attained to a degree of virtuosity which is scarcely inferior to his well-known proficiency on the Tromlitz flute. Next week he will start on a trip to England.⁷⁷

* * * * *

“Herr Treichlinger and Herr Böhm had several recalls after their performances.

“P.”

⁷⁷ This notice of the Boehm flute in the *Bazar* was an epitome of an account of the instrument which was published in full in *The Allgemeine Musikalische Zeitung*, but it did not appear in that journal until nine months afterwards, in January 1834. In the ordinary working of the periodical press, matter of the nature of reviews is pigeon-holed time after time to make way for more pressing items; indeed, such articles are often purposely put aside until they are required to fill a vacant place. The clever Mr. Rockstro takes advantage of the delay to transform the statement that Boehm “has only been able to practise on his new flute for about half a year” into the assertion that Schafhäutl says that Boehm first had an instrument of the new kind on which to practise in July 1833! See the quotation from his *Treatise on the Flute*, given in note 80, *infra*, p. 254.

We here have evidence that by April 1833 Boehm had mastered the difficulties of his new flute, for he played variations so brilliantly as to be recalled several times. But we can trace back his appearance in public with the instrument yet another period; four months before this time he was so far advanced as to be able to "let" an audience "hear something pleasing." Early in 1833 there appeared in the 'Allgemeine Musikalische Zeitung' a review, not like the account in 'Der Bazar,' from the pen of Schafhüttl,⁷⁸ of the most important musical events in Munich of the previous year. In the notice of a concert given on the 1st of November of that year (1832) is a statement, of which the following is a literal translation: "Herr Boehm let us hear something pleasing on the flute which he himself, with his own hand, has ingeniously remodelled with several keys and new openings, with a view to a higher effect."⁷⁹

We are now, after the lapse of more than half a century, asked to believe that these statements, as far as they enable us to say that 1832 was the year in which the Boehm flute was constructed, are a tissue of falsehoods. On what grounds are we called upon to reject them? On the ground that they involve an improbability so great as to amount to an impossibility; "such a comprehensive improvement" being beyond the powers of a dolt like Boehm, no matter whether we give him three months or two years in which to effect it, "unless he had meanwhile received much light from an intelligence far superior to his own." This light did not begin to shine until Gordon arrived at Munich in 1833. Mr. Rockstro is "thus led irresistibly to the conclusion that Boehm copied the general design of his

⁷⁸ *Infra*, p. 418.

⁷⁹ "*Herr Böhm hat uns etwas Angenehmes hören lassen auf der Flöte, die er selbst mit eigener Hand und mit mehreren Klappen und neuen Oeffnungen erfinderisch zu höherem Effecte umgeschaffen.*"

flute from Gordon's, but that he altered, and to some extent simplified the mechanism."⁸⁰ But

“O, what a tangled web we weave,
When first we practise to deceive!”

The web is just as tangled whether the deceit we practise is on others, or on ourselves. We shall now have to see to what straits Mr. Rockstro is reduced in his efforts to extricate himself from the meshes of the net in which he has thus become enveloped.

On his arrival at Munich, Gordon, we are told, “completely rejected his system.” Why did he reject it? We get an answer to this question from Boehm. “He soon became convinced,” he says, “of the defects of his flute in comparison to mine.”⁸¹ But according to Mr. Rockstro the Boehm flute had not seen the light—it was still lying hidden in the womb of time, the theft to which it owed its existence not having been yet committed. It therefore becomes necessary to draw on the imagination for another explanation. Accordingly we are told that Gordon rejected his system “because Boehm induced him to do so.”

⁸⁰ To show that I have not misrepresented Mr. Rockstro, I give his own words :—“On comparing the flute said by Boehm to have been made ‘at the beginning of 1832,’ with that said to have been made by him in 1831, one cannot help being struck by the improbability of such a comprehensive improvement having been effected by Boehm in so short a time unless he had meanwhile received much light from an intelligence far superior to his own. Even if we were to adopt the account of Schafhäutl (§ 597), and to fix the date of the completion of the flute from the time at which he says Boehm first had an instrument of the new kind on which to practise, which would have been in July 1833, the improbability would not be much lessened. We are thus led irresistibly to the conclusion that Boehm copied the general design of his flute from Gordon's, but that he altered, and to some extent simplified, the mechanism.”—*Rockstro on the Flute*, section 603, p. 338.

⁸¹ *Essay on the Construction of Flutes*, p. 15. In the printed copy “defects” appears as “effects,” but “defects” is the word Boehm wrote.

Ce n'est que le premier pas qui coûte. Mr. Rockstro, having thus put his foot in, determines to take a plunge. Acting on the principle advocated in the homely adage, "'Tis as well to be hanged for a sheep as a lamb," he adds, we are almost driven to the conclusion that "while the poor gentleman was thus being led off on a false scent, Boehm was engaged in appropriating the ideas, and modifying the details of the scheme that he had persuaded his rival to abandon."⁸² It is true that there is here a saving clause. We are not *quite* driven. This time the conclusion is not absolutely irresistible. But how are we *almost* driven to believe so abominable an imputation? Are we driven by testimony? Are we driven by evidence? Are we driven by the logic of facts? Or are we driven by listening to the story of a dream?

But it is not only Boehm and the other Munich witnesses whom Mr. Rockstro finds it necessary to accuse of mendacity in order to convert his dream into a reality, he is forced to charge Gordon himself with falsehood! Having become dissatisfied with his instrument, Gordon, with the assistance of Boehm's workman, proceeded to make another flute, in the construction of which, as he himself states, he adopted Boehm's mechanism for F sharp, or, as Mr. Rockstro prefers to call it, for closing the G hole. But according to Mr. Rockstro's hypothesis this mechanism had as yet no existence, the flute on which it appeared not having at this time been invented. How then could Gordon have borrowed it from Boehm? Mr. Rockstro, who combines the wiles of Ulysses with the audacity of Jack the Giant-killer, meets this objection

⁸² "We are, in fact, almost driven to the conclusion that Gordon for the time 'completely rejected his system' (see § 576) because Boehm induced him to do so, and that, while the poor gentleman was being thus led off 'on a false scent,' Boehm was engaged in appropriating the ideas and modifying the details of the scheme that he had persuaded his rival to abandon."—*Rockstro on the Flute*, section 608, p. 340.

by a bold stroke. Notwithstanding Gordon's specific assertion, he denies that Gordon did borrow it of Boehm, and, what is more, he asserts that Boehm himself attributes to Gordon this very mechanism, the origin of which, it will be remembered, we have so lately endeavoured to trace.

To render Mr. Rockstro's *modus operandi* more intelligible I will beg leave to be allowed to give an illustration of the ingenious and interesting plan he has adopted of dealing with subjects with which he is not acquainted. As this delightfully simple process effects an immense saving of time and trouble by rendering information unnecessary and useless, it cannot be too highly commended to our Universities, our Public Schools, and our other seminaries of useful and scientific learning: It is not free, it is true, from a trifling drawback. It presents a suspicious resemblance to a method which once reigned supreme; a method under which authority arrogates to itself the right to burke truth; the method by which Galileo was politely requested to state that he was mistaken when he said that the earth moves round the sun. If facts do not agree with Mr. Rockstro's notions, so much the worse for the facts. However, in these degenerate days this system is so far exploded that Mr. Rockstro cannot treat those of whose opinions he does not approve, as Galileo would have been treated, had he not caved in. He can do his best to keep the thoughts of other minds, and the works of other hands out of sight, but he cannot rekindle the fires of Smithfield for the benefit of such heretics as Mr. Walter Broadwood, Mr. Victor Mahillon, or your humble servant. He can throw the pall of silence and darkness over Mr. Radcliff and Mr. Collard, but he could not, even if he were so disposed, put these gentlemen into the pillory and cause their obnoxious models to be burnt by the common hangman.

If we are to trust the accounts of travellers, and the

evidence of our senses, there is a flute which is played with the nose instead of the mouth.

The chief home of the nose-flute is the islands of the Pacific Ocean. It is found in both Polynesia and Melanesia; but it is not confined to these regions. Instruments played with the nose are used in the Malay Peninsula; they have been traced to the Guarani of the interior of South America, and have even been seen in the hands of the Botocudos of the east coast of Brazil. Scores of nose-flutes have been brought to Europe. In one room alone of one museum, the Pitt-Rivers room of the New Museum at Oxford, there are more than a dozen such instruments.

To the anthropologist the nose-flute is an object of great interest. How could such an instrument have originated? What, he asks, could have induced a man possessed of lips to apply the flute to his nose? Is the nose-flute related by birth to the mouth-flute, or does it belong to a separate stock?

Assuming that the two instruments are members of the same family, in what relation do they stand to each other? Peradventure can it be, as has been suggested, that the nose-flute is the father of our instrument? It certainly cannot be denied that in the nostril we have a natural flue, whilst that formed by the lips is purely artificial.

Or is the nose-flute a son or a brother of the mouth-flute, a scion who owes his popularity to the unassuming softness of his plaintive voice—soft notes being considered by the Pacific Islanders "good to hear," as we are told by Dr. Codrington?

This explanation will commend itself to those who are of opinion that the flute is a humble instrument, whose strength lies in its weakness; that to attempt to make it rival the trumpet, or, to use Nicholson's expression, to cause it to "roar," is only to expose it to contempt; that the soft complaining notes elicited by the

blind beggar from his yellow flute, so touching in their expression of feebleness, humility, and patient suffering, should be regarded as typical of the true flute-tone.⁸³

⁸³ "Each instrument," says Walckiers in his *Method*, "has a character which is peculiar to it. The characteristics of the flute are sweetness, tenderness, and melancholy; to will that it should have the fire and the thrilling force (*le brio et le mordant*) of the violin is folly." That Boehm recognised these to be the true qualities of the flute, and was alive to the folly to which Walckiers alludes, is evident from the following description of his playing by a critic who contrasts his style with that of Molique on the violin (see *infra*, p. 386): "The difficulties he (Molique) conquers are incredible, and the force of his playing carries his hearers away with a feeling of confidence in his safety and correctness. Böhm, on the other hand, appears differently as a flautist. The characteristic of his playing is a soft development of a mild elegiac sentiment, a beautiful romantic longing; his singing on his instrument springs from a profoundly sensitive breast. He is distinguished by the way he expresses all the shadings and *nuances*, and the sweet melancholy of his charming style."

On the subject of the flute viewed as an orchestral instrument, Berlioz expresses himself thus: "The sound of this instrument is sweet in the medium, rather piercing in the high notes, and very characteristic in the low ones. The quality of tone of the medium and that of the high portion has not a very special or decided expression. It may be employed in melodies, or accents of varied character, but without equalling the artless gaiety of the hautboy, or the noble tenderness of the clarinet. It would seem, then, that the flute is an instrument well-nigh devoid of expression, but which may be introduced anywhere and everywhere, on account of its facility in executing groups of rapid notes, and in sustaining high sounds useful in the orchestra for adding fulness to the upper harmonies. Generally speaking, this is true; nevertheless, on studying the instrument carefully, there may be discovered an expression peculiar to it, and an aptitude for rendering certain sentiments, in which no other instrument can compete with it. If, for instance, it were requisite to give to a sad air an accent of desolation, but of humility and resignation at the same time, the feeble sounds of the flute's medium, in the keys of C minor and D minor especially, would certainly produce the desired effect. One master only seems to me to have known how to avail himself of this pale colouring; and he is Gluck. In listening to the melodramatic movement in D minor, which he has placed in the Elysian Fields scene of *Orfeo*, it will be at once

The nostril cannot be compressed like the lips, and so the performer on the nose-flute is freed from the danger of giving way to the temptation, should it assail him, of attempting to produce those "reedy" or "horny" sounds to which some so love to listen, but which others regard with abhorrence as the embodiment of what is most coarse, vulgar, and offensive in flute-playing.

Or, again, could the nose-flute have been brought into existence out of deference to some one or other of the many religious fancies which in primitive days ruled mankind? Could it have been required for some rite, function, or observance, all knowledge of which has perished? Or can it owe its origin to some mysterious curse which may have been pronounced on the mouth-flute? For instance, could the ban under which whistling, that wicked practice which even in Europe is still said to make the angels weep, and to scare away the Holy Ghost,⁸⁴ was once placed, have been extended to the

seen that a flute only could fittingly utter this melody. A hautboy would have been too puerile, and its voice would not have seemed sufficiently pure; the corno inglese is too low; a clarinet would doubtless have answered better; but certain sounds would have been too powerful—none of its softest notes would have reduced themselves to the feeble, faint, veiled sound of the F natural of the medium, and of the first B flat above the lines, which imparts so much sadness to the flute in this key of D minor, where these notes frequently occur. In short, neither the violin, the viola, nor the violoncello, used in solo or in masses, would serve to express this very sublime lament of a suffering and despairing departed spirit. It required precisely the instrument selected by the author, and Gluck's melody is conceived in such a way that the flute lends itself to all the uneasy writhings of this eternal grief, still imbued with the passions of earthly life. It is at first a voice scarcely audible, which seems to fear being overheard; then it laments softly, rising into the accent of reproach, then into that of profound woe, the cry of a heart torn by incurable wounds, then falling little by little into complaint, regret, and the sorrowing murmur of a resigned soul. What a poet!"—*Modern Instrumentation*, Berlioz, p. 117.

⁸⁴ "The Arabs generally disapprove of whistling, called by them

mouth-flute on account of its shrillness, for the puckering of the lips necessary for the embouchure, or for some other unknown reason ?

But, however this may be, there is an instrument blown with the nose still employed for the purpose of *charming*, that is, influencing that mystery of mysteries, the spiritual essence : the *toomerie* of the Indian snake-charmer.⁸⁵ In India a religious or ceremonial origin is assigned to the practice of using the nose instead of the mouth. It is said that the *toomerie* is blown with the nostril because a Hindoo of high caste is defiled if he touches with his mouth anything which has been previously touched by the mouth of one of lower caste ; but this defilement does not extend to contact with the nose. Now should the nose-flute prove not to be older than the institution of caste in India, and if it can

el sifr. Some maintain that the whistler's mouth is not purified for forty days ; whilst others are of opinion that Satan touching a man's person causes him to produce the offensive sound. The natives of the Tonga Islands, Polynesia, consider it wrong to whistle as being disrespectful to their gods. In European countries people are met with who object to whistling on a certain day of the week, or at certain times of the day. The villagers in some districts of North Germany have the saying, that if one whistles in the evening it makes the angels weep. The villagers in Iceland say that even if one swings about him a stick, whip, wand, or aught that makes a whistling sound, he scares from him the Holy Ghost ; while other Icelanders, who consider themselves free from superstitions, cautiously give the advice : ' Do it not ; for who knoweth what is in the air ? ' "—Engel's *Musical Myths and Facts*, p. 91.

⁸⁵ The *toomerie* is a variety of the snake-charmer's *poongee*, a double pipe played with a reed like that of the *arghool*. The tops of the tubes (one of which is a drone) with the reeds are inserted into one end of a gourd, or a caddos nut, the performer impelling his breath through the nostril into the opposite end. The music produced will entice the largest and most dangerous cobra from its hole. See Engel's *Catalogue of Musical Instruments in the South Kensington Museum*, p. 166. The irreverent Engel makes the scoffing suggestion that "perhaps the serpents mistake it for the quacking of ducklings, for which they may have a taste."

be shown that the idea of playing the flute with the nose originated in the Hindoo instrument, an explanation of the origin of the nose-flute will be established which will have an important bearing on a not unimportant subject. It will indicate that there was once a connection, contact, or intercourse of some kind or other between the interior of Asia and the islands of the Pacific Ocean; and thus a link will be added to a chain of evidence which tends to show that certain waves of culture have floated from India over the south-east or Indo-Chinese region and the Indian Archipelago, and thence into Melanesia and Polynesia.⁸⁶

Attention was first drawn to the nose-flute by Captain Cook, the instrument represented overleaf being one brought home by Reinhold Forster who accompanied that distinguished navigator in the capacity of naturalist. Its length is rather more than fifteen inches. It is bound with sennit made of the fibres of the palm, and in addition to the nose-hole (*a*) it is pierced with two finger-holes (*b* and *c*), whilst a knot in the bamboo of which it is made acts as a stopper.

Mr. Henry Balfour, the Curator of the Pitt-Rivers collection, to whom I am indebted for the photograph from which the engraving is taken, is an expert performer on the nose-flute. He fails to understand why it should be considered less easy to sound the flute with the nose than with the mouth. Every flute-player who has made the attempt knows how exceedingly difficult it is to blow the Egyptian *nay*. Yet Mr. Balfour makes

⁸⁶ The subject is discussed in an interesting paper by Dr. Tylor, entitled *Notes on the Asiatic Relations of Polynesian Culture*, published in the *Journal of the Anthropological Institute*, May 1882. To render the argument conclusive, it would be necessary to show that there is evidence, in the construction or the method of using the nose-flute, of it having been copied from the Indian instrument. Otherwise, there would be no proof that each of the two instruments might not have had an independent origin, or that they might not both have sprung from some common source.



Fig. 41. — Nose-Flute. *a*, Nose-hole; *b*, *c*, Finger-holes.

speak with the greatest ease by means of the nostril a form of nose-flute which is blown, like the *nay*, across the open end of the tube, there being neither stopper nor nose-hole. The tone he produces on the instrument shown in Fig. 41 is extremely agreeable to the ear, and so closely does it resemble a tone which can be elicited from the modern cylinder blown with a loose lip, as to be scarcely, if at all, distinguishable from it when the two flutes are sounded together.

In the history of his first voyage Captain Cook gives the following account of a performance of nose-flute music to which he was invited by a chief of Otaheite: "On the 22nd (of April 1769), Tootapah gave us a specimen of the music of the country; four persons performed upon flutes which had only two stops,⁸⁷ and therefore could

⁸⁷ Captain Cook adds: "To these stops they apply the forefinger of the left hand and the middle finger of the right. They also have an expedient to bring the flutes that play together into unison, which is to roll up a leaf so as to slip over the end of the shortest, like our sliding tubes for telescopes, which they move up and down till the purpose is answered, of which they seem to judge by the ear with great nicety."—*Hawkesworth's Voyages*, vol. ii. p. 205.

It seems not unlikely that the leaf, instead of being slipped *over* the end of the flute, was slipped *into* it, for there is an enlargement of bore which one cannot help supposing to be designed to receive the leaf, and so to form a socket for this primitive tuning-slide. Indeed, it may be interesting to notice that it was to the lower end of the one-keyed flute that the tuning slide was first applied. Before its introduction, flute-players raised or lowered the pitch of their instruments by means of interchange-

not sound more than four notes by half tones : they were sounded like our German flute, except that the performer, instead of applying it to his mouth, blew into it with one nostril, while he stopped the other with his thumb : to these instruments four other persons sang, and kept very good time ; but only one tune was played during the whole concert."

A comparison of the nose-flute Fig. 41 with one of my mouth-flutes bears out to the letter the accuracy of Captain Cook's statements respecting the instruments he heard at Tootapah's concert. The four notes sounded "by half tones" are G¹, A¹ flat, A¹ and B¹ flat of our scale at the English pitch.⁸⁸ The notes are produced by

able middle joints, or *corps de rechange*, varying in length. "It was conceived," writes M. Victor Mahillon (*Encyclopædia Britannica*, ninth edition, art. *Transverse Flute*), "that the just relation" interfered with by the use of *corps de rechange* "could be re-established by dividing the foot into two pieces below the key. These two pieces were adjusted by means of a tenon, and it was asserted that, in this way, the foot could be lengthened proportionately to the length of the middle joint. Flutes thus improved took the name of *flûtes à registre*. The register system was about 1752 applied by Quantz to the head joint."

⁸⁸ It should not be supposed that all nose-flutes yield these four notes. Nose-flutes differ in length, in size, and in the number and position of the finger-holes. They are often made double—two instruments, each with its own finger-holes, on the same tube, with a nose hole at each end. Sometimes the nostril is closed with the left, sometimes with the right thumb.

In the Marquesas, according to Melville, the nostril is not closed with the thumb, but "by a peculiar movement of the muscles about the nose," and thus a "soft dulcet" sound is elicited from a "beautiful scarlet" instrument.

The following is from Ellis's *Polynesian Researches*, ch. viii. : "The *vivo* or flute was the most agreeable instrument used by the islanders. It was usually a bamboo cane, about an inch in diameter, and twelve or eighteen inches long. The joint in the cane formed one end of the flute ; the aperture through which it was blown was close to the end : it seldom had more than four other holes, three in the upper side, covered with the fingers, and one beneath, against which the thumb was placed. Sometimes, how-

raising the fingers in the usual way ; the A being got by a back fingering, by closing *c* but leaving *b* open.⁸⁹

Much has been written about the difficulties to be encountered in bringing the holes of the flute within reach of the fingers ; but it will be observed that the untutored Polynesian flute-maker has discovered a spot within two inches of the nose-hole, and so lying just under the first finger of the hand with the thumb of which the nostril is stopped, where a hole (*b*) can be bored on opening which there is produced a note (A), the hole for which his European brother considers himself obliged to place about a foot from the mouth-hole ; and that he has found a second spot, situated in a convenient position for the middle finger of the other hand, where he has made an aperture (*c*), on uncovering which, while the first-named hole (*b*) is kept open, there is heard a note (B flat) half a tone higher still. Although the musical interval between these two notes is only that of a semitone, yet the two holes are nearly ten inches apart.⁹⁰ I ought to have mentioned that the distance

ever, there were four holes on the upper side. It was occasionally plain, but more frequently ornamented, by being partially scorched or burnt with a hot stone, or having fine and beautifully plaited strings of human hair wound round it alternately with rings of braided cinet. It was not blown with the mouth, but with the nostril. The performer usually placed the thumb of the right hand upon the right nostril, applied the aperture of the flute, which he held with the fingers of the right hand, to the other nostril, and moving his fingers on the holes, produced his music. The sound was soft, and not unpleasant, though the notes were few ; it was generally played in a plaintive strain, and frequently used as an accompaniment to their *pehes*, or songs. These were closely identified both with the music and the dances. The *ihara*, the drum, and the flute were generally accompanied by the song, as was also the native dance.⁹¹

⁸⁹ That is to say, the G is produced by closing the two finger-holes *b* and *c* ; the A flat by opening *c*, but keeping *b* closed ; the B flat by opening both *b* and *c* ; the A by closing *c* only.

⁹⁰ The explanation of this acoustic puzzle is (at least so it seems to me) that the hole *b* does not produce a note of its own, but acts

from the nose-hole to the first finger-hole is about $1\frac{3}{16}$ inch, to the second $1\frac{3}{16}$ inches; the diameter of the nose-hole about $\frac{9}{32}$ inch, of the first finger-hole $\frac{7}{32}$ inch, of the second rather less than $\frac{1}{8}$ inch, and the diameter

by raising the two notes G and A flat to A and B flat respectively. The larger the embouchure of a flute, the higher become the notes. With this property of his instrument every flute-player is familiar, as he makes constant use of it by turning the flute outwards, and so increasing the size of the embouchure by uncovering a larger part of it, when he wishes to sharpen a note. By boring a special hole below, but within a certain distance of the nose-hole, the nose-flute maker is able to avail himself of this power of sharpening to such an extent that he raises the notes of his instrument a whole tone. Thus the nose-flute here figured has, properly speaking, only two notes, G and A flat; but these two notes are raised by uncovering the hole *b* to A and B flat, and in this way two notes are gained.

About a century ago it was proposed to apply this principle to our flute. On the 24th of July, 1801, Mr. William Close addressed a communication to Mr. Nicholson, the editor of the *Journal of Philosophy*, "on the Properties of Wind Instruments consisting of a single Pipe or Channel, with Improvements in their Construction." "Our small wind instruments," he remarked, "have many imperfections, but are the subject of so little direct importance to society that we do not expect much celerity in their improvement." The improvement he proposed was the introduction of a new way of making the semitones by conferring on the player the power of raising any note half a tone. He writes: "In some experiments . . . I have endeavoured to realise a project for a very easy method of introducing the chromatic semitones into the natural scale, and of sharpening any number of diatonic notes at pleasure." One of the expedients to which he proposed to have recourse for this purpose is thus described: "Insert one end of a round pipe, three-tenths of an inch in diameter, and one inch long, into the inside of a German flute, so much nearer the holes for the fingers than the sound hole that a line which encircles the flute, and passes through the middle of this last hole, may be seven-tenths of an inch from the centre of the interior orifice of the pipe. . . . Turn this pipe by the side of the flute, and let its exterior orifice be closed by a valve or key, which may be opened by the thumb of the left hand."

Mr. Close indicates the pipe by dotted lines in a drawing he gives of the model on which the experiment was made, but he states he had not had a flute constructed in the way described.

of the bore at the nose-hole $\frac{1\frac{3}{8}}{8}$ inch; towards the lower end, below the second finger-hole, between $\frac{1}{16}$ and $\frac{1}{32}$ inch less. Thus the diameter of the bore of this flute comes very close to that of our cylinder, which measures $\frac{6}{8}$ inch.

Now it seems that Mr. Rockstro, sitting at home at ease, knows far more about the nose-flute than Captain Cook and all the other travellers who have seen and heard it played.⁹¹ The statement that it is sounded like the German flute is a traveller's tale, a mere hallucination. The nose-flute is simply "nothing of the kind." The thing is "an impossibility." Of course it is. It is just as great an impossibility as that Boehm could invent his own flute. The impossibility of blowing the flute with the nose requires no demonstration; it is "manifest." Certainly; it is not less manifest than that Boehm was an ignorant impostor.

But this is not all. Mr. Rockstro does not stop here. He is not content with enlightening us on what the nose-flute was *not*, he can set Captain Cook right, and tell us what it "must have been." It was neither a flute, a clarinet, a hautboy, a bassoon, nor a bagpipe; it "must have been" the pet object of Mr. Rockstro's aversion, a whistle. Tootapah's quartett of nose flute-

"Had he done so," remarks Mr. Rockstro, "the experiment must have been musically unsuccessful." But whatever it "must have been" in the hands of Mr. Close, it seems that the Pacific Islanders have been able to turn the principle to account.

⁹¹ The latest description of nose flute-playing with which I am acquainted is the following from Lambert's *Voyage of the 'Wanderer'* (1883): "Now we hear a deep whistling sound" (the 'Wanderer' was touching at one of the Tonga Islands) "varying up and down only two or three notes, and find a lot of natives playing on nose-flutes made of bamboo. To perform on these you block up one nostril with your thumb, while the fingers belonging to the same hand extend along the instrument, and with the other nostril you play your tune—if you know how! The effect produced is very like that of the sign of contempt called by boys 'taking a sight.'"

players must have been nothing of the kind; they were so many performers upon whistles.⁹² In fact, Mr. Rockstro has made so fierce a raid on the tree of knowledge, that not satisfied with taking the fruit, he has carried off the leaves as well, and so has left the poor plant to perish.



Fig. 42.—Girl playing Nose-flute. From Williams's *Fiji and the Fijians*.

We will now return to Boehm and Gordon. When Boehm saw Gordon in London he observed that "the E hole of his flute was bored lower down than usual, and was covered with a key; and to avoid the F lever he made use of a ring-key."⁹³ We should naturally like to know how he avoided the F lever, and of what sort of ring-key he made use; but on neither of these points have we any information. There are, as we know, ring-keys of various kinds. I have already had occasion to mention three: Nolan's ring-key, the ring-key of Gerock and Wolf's flute, and the ring-key of the Boehm flute. Mr Rockstro has brought to light a fourth, a ring-key employed by Dr. Pottgiesser, a key which combines a ring with a crescent, and so deprives poor Gordon of what we had previously believed to be his original idea, the crescent-key. Thus four kinds of

⁹² *Rockstro on the Flute*, section 306, p. 136.

⁹³ *Essay on the Construction of Flutes*, p. 12.

ring-keys are known to us, whilst, in addition to them, a ring-key of some sort was seen by Buffet on Blève's clarionet in 1826;⁹⁴ nor can we say how many others, the designs of which have perished, may not have been contrived.



Fig. 43.—Dr. Pottgiesser's Ring and Crescent Key.

What we know of the ring-key which Boehm saw on Gordon's flute is chiefly of a negative character. We know, for instance, that it was not the same as that which Boehm employed, for Boehm placed the finger on the E hole, whilst Gordon covered this hole with a key. That it was not a satisfactory arrangement we know from the reference made to it by Clinton, who says "it was not until Mr. Boehm suggested a mechanism for the right-hand part that his (Gordon's) improvement (of the flute) became in any shape available"; and we know from Gordon's own admission that it left "the means of execution" on his instrument still incomplete.

No sooner, however, does Mr. Rockstro appear on the scene than the clouds of darkness which had previously enveloped the ring-key which Boehm saw on Gordon's flute are instantly dispelled. The method of inquiry which he has applied with such transcendent success to the nose-flute is brought to bear with a result equally startling on Boehm's account of Gordon's ring-key. Again, Mr. Rockstro has brought to light an "impossibility"; again, the impossibility becomes "manifest"; again, Mr. Rockstro knows what it "must have been." The discovery which he has thus made is, as he very properly remarks, of a curious character. It is nothing else than that Boehm in his allusion to Gordon's

⁹⁴ See p. 44.

contrivance attributes to Gordon the mechanism for closing the G hole which Gordon afterwards took from Boehm. Below I reprint Mr. Rockstro's announcement of his discovery in his own words, to enable any one, who may be so disposed, to attempt to thread his way through the maze of his *must-have-beens*, and to find the path, if he can, to his "inevitable conclusion."⁹⁵

In his struggles with evidence, Mr. Rockstro meets with the difficulty which Hercules had to encounter in his combat with the Hydra; no sooner is one of his antagonist's heads cut off than two others spring up in its place. If Gordon had this key for making F sharp on his flute before he made Boehm's acquaintance, how came it to pass that he gave a certificate that he was indebted to Boehm for the knowledge of it?

The logical Hercules is again equal to the occasion. He seizes his trusty club Must-be, and with a few vigorous strokes smashes Gordon's statement to atoms. At first he modestly ventures, but immediately "we can scarcely refuse," then "it may be assumed," next "we

⁹⁵ With regard to the mechanism for closing the G natural hole, we have curiously conflicting statements by Boehm attributing it to Gordon, see section 558, and by Gordon attributing it to Boehm, see section 604. We will first examine the statement by Boehm: "The *e* hole of his flute was bored lower down and was made larger than usual. It was covered with a key, and in order to avoid the lever for F natural, he employed a ring-key." Although this may appear, at the first glance, a very simple recital, it contains an absolute contradiction. The only object of covering the *e* hole with a key *must have been* to enable the third finger to close the hole while the first and second fingers remained in their usual positions. The only object of the ring-key *must have been* to enable the first finger to close the *g* hole while the third finger remained in its usual position. The *impossibility* of the correctly placed *g* and *e* holes being closed directly, and at the same time, by the first and third fingers of an ordinary hand is *manifest*, but either one of the above mentioned contrivances would have been sufficient to effect the desired object, and the combination of the two would have been absurd. We are therefore left to the *inevitable conclusion* that the two appliances were on different flutes.

may easily suppose," now "it is clear," further it "appears," afterwards "it would seem," and finally it again "appears."⁹⁶

But, under cover of the clatter of the blows of the club, Mr. Rockstro is quietly leading us away from the point we are discussing, to plunge us into the fallacy of an *ignoratio elenchi*, or false issue. The conclusion he draws from his chain of fancies is that Gordon was a man of such extraordinary honour and generosity that he lied in order to assign to Boehm a larger share of the credit than was due to him; whereas the question we have to settle is not whether Boehm was entitled to much or to little credit, but whether he did or did not communicate the knowledge of this key for F sharp to Gordon.

On this point nothing can be clearer, or more explicit

⁹⁶ In the following, which is a continuation of the passage quoted in the last note, the italics, I need not say, are not Mr. Rockstro's. "Leaving further discussion of the key for covering the *e* hole, which was no doubt similar to that of Tromlitz, we will revert to the declaration of Gordon. 'The idea of this key for F sharp, communicated by Mr. Theobald Boehm of Munich, has been, with his consent, adopted for the present flute.' In order to reconcile this statement with Boehm's, I venture to suggest the following explanation. *We can scarcely refuse* to accept the evidence of Boehm, namely that, the notion of using a ring-key in order to avoid the necessity for the employment of the old closed F natural key was originated by Gordon, and *it may be assumed* that the ring-key was for the purpose of covering the G hole. *We may easily suppose* that Gordon was not satisfied with this contrivance, and *it is clear* that Boehm was not satisfied with the ring-key that he made for Gerock and Wolf, which *appears* to have been partly copied from Nolan's open G sharp key. *It would seem* that Boehm then improved upon this arrangement, and contrived the now discarded mechanism shown in Fig. 56 (Fig. 36, p. 240, of this work). Gordon *appears* to have adopted an arrangement somewhat similar to this, employing Pottgiesser's crescent instead of Nolan's ring, and having thus made some use of Boehm's invention, he, following the dictates of his well-known generous disposition and punctilious sense of honour, attributed to Boehm a larger share of the credit than was justly due to him."

and precise, than the language of Gordon's declaration. He does not say that he merely "made some use of Boehm's invention," but he states that he was indebted to Boehm for the very idea of this key. His words are: "the suppression of the two keys for F natural, and their replacement by one key for F sharp, is an idea, the application of which offers great advantages. The idea of this key for F sharp, communicated by Mr. Theobald Boehm of Munich, has been, with his consent, adopted for the present flute, of which it completes the means of execution." Which are we to believe, Captain Gordon or Mr. Rockstro?

We have already had opportunities of admiring Mr. Rockstro's accomplishments in the character of an historian and a logician; we shall now see him displaying his versatile talents in another capacity, that of a conjuror. Such is his skill in turning black into white, that it would cause a professor of the art of making our eyes "the fools o' the other senses," as Macbeth terms it, to die of envy. He treats us to an exhibition of sleight of hand which combines the wonders of the Disappearing Lady with those of the conversion of a gentleman's watch into a live rabbit.

The key for F sharp was not the only one which Gordon took from the Boehm flute, he took also that for shaking D (*a*, Fig. 12, p. 107). It appears that Capeller, Boehm's master, used a key for making this shake, but this did not prevent Gordon from taking the idea from Boehm, and acknowledging that it was from him that he obtained it. This we learn from Coche who, publishing the drawing of Gordon's flute in his *Method*, caused the fact to be engraved on the plate in the following words, at the same time giving his authority, Gordon's *Tablature*, thus: *The key for F sharp and the key for the shake of D belong to Mr. Boehm* (Gordon's *Tablature*).

On p. 273 is a reproduction of Coche's pictorial puff of himself and his flute, with the original French, as

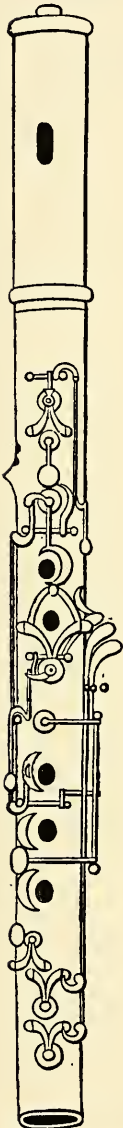
it here appeared. But no sooner does our magician wave his wand than the words "Gordon's Tablature" vanish, and the sentence is converted from an acknowledgment by Gordon of his indebtedness to the Munich flute-maker into a proof that Coche "seems to have erred on the side of excessive generosity towards Boehm."⁹⁷

This is indeed a marvellous triumph of the black art ; but I fear that lawyers who have the bad taste to prefer their nasty, dry, dusty, rusty, fusty, musty, crusty facts to juggling tricks, no matter how cleverly performed, would say that such a transformation as this was garbling carried to the extent of falsifying evidence. Lawyers have no imagination. *Ne sutor ultra crepidam.* Let them confine themselves to their yellow old title deeds.

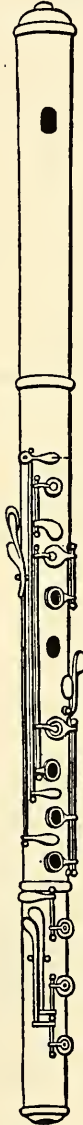
We have already had enough of logic and legerdemain. However, I will give one more instance (it shall be the last) of Mr. Rockstro's expedients for meeting the difficulties he has raised up for himself.

⁹⁷ "Coche, who seems to have erred on the side of excessive generosity towards Boehm, appends this footnote to the engraving of Gordon's flute in his *Méthode* : 'La clé du F \sharp , et la clé du Re, appartiennent à M. Boehm.' (The key for F \sharp and the key for the shake with D \natural belong to Mr. Boehm.) Evidently Coche knew nothing of the *d''* key invented by Boehm's instructor, Capeller." (*Rockstro on the Flute*, section 605, p. 339). Nor did Mr. Rockstro know when he wrote these words that we should be told by Boehm's biographer, Dr. Schafhäutl, that the mechanism of Capeller's flute was the invention of Boehm (see p. 377). According to Mr. Rockstro, Capeller is chiefly remembered as the inventor of the contrivances of this mechanism (*Treatise on the Flute*, section 884, p. 580), so that, if the contrivances in question were invented by Boehm, he shines with a borrowed light. Although what Boehm had done aroused in Mr. Rockstro a feeling of "disgust," yet this gentleman sets forth in various parts of his work the advantages of the D shake key, and adds, "The strongest proof of the value of this invention lies in the fact that it is in constant use on every flute of modern construction."

Invention
GORDON.



Modification
BOEHM.



Perfectionnement
V. COCHE.



(N.B.) La Clé du FA \sharp , et la Clé du Trille du RE $\bar{}$, appartiennent à Mr. BOEHM. (Tablature Gordon.)

Fig. 44.—Coche's Pictorial Puff.

It becomes necessary for him to prove Boehm's assertion that he played upon his new flute in London in the year 1833 to be false. It was stated, as we have seen, in 'The Harmonicon' of August 1833, that Boehm was "on the point of setting out on a professional journey to England." If he did not carry out this intention of visiting England until two years afterwards, it would not affect the evidence which the paragraph in 'The Harmonicon' affords, that in July 1833 Boehm had been practising on his new flute for about six months; but if Boehm did visit England, and was playing that flute in London at the time when Mr. Rockstro represents him to be engaged at Munich in robbing Gordon of the idea of it, that gentleman's story falls to the ground. Mr. Rockstro has therefore to get Boehm's alleged visit to London in 1833 out of the way, and this he endeavours to do in the following manner.

He prints the statement in 'The Harmonicon' of August 1833: "Mr. Boehm is on the point of setting out on a professional journey to England," in juxtaposition with the following, published in a German newspaper about twelve months afterwards (July 2nd, 1834): "Mr. Böhm of Munich, the inventor of a new flute, is going to Bremen and to Hamburg, and thence to England, at which places he will give concerts and perform on his new instrument." The interpretation which ordinary minds would put on these statements is that they refer to two separate visits; one undertaken in 1833, the other in 1834. Boehm, as he told me himself, came to England no less than nine times. When we consider that at this time he had his pianoforte project in hand at Gerock and Wolf's, and that it was in 1833 that he began to connect himself with the ironworks,⁹⁸ there is nothing improbable in the circumstance that he visited London two years in succession. Mr. Rockstro, however, comes to a very different conclusion. He is of

⁹⁸ *Essay on the Construction of Flutes*, p. 13.

opinion that the two newspaper statements "may be taken together as fair proof that Boehm did not visit this country in 1833."

To a casual reader this argument seems innocent enough; it is only trifling with common sense. But it assumes a very different complexion in the eyes of those who know that Mr. Rockstro is here having recourse to tactics to which controversialists object still more strongly than even to garbling; he is suppressing evidence. The evidence which is suppressed does not appear in a work of the existence of which, as of this little book, Mr. Rockstro feigns ignorance, but is found in a pamphlet which he acknowledges, catalogues and quotes, Clinton's *Treatise on the Flute*. Mr. Clinton can tell us not only that Boehm came to London twice, but that the English public had an opportunity of examining as well as of hearing his new flute, for it was offered for sale at Gerock and Wolf's. He even knows how much, or rather how little business Boehm did on these occasions.

Clinton's connection with Boehm has been divided into two stages: the one friendly, during which he played on his flute, and defended him from the attacks made upon him; the other hostile, when he became an apostate, and having set himself up as a rival flute-maker, proceeded to disparage the Boehm flute, and to impugn Boehm's title to the originality of the invention. It was in the second, or hostile period of Clinton's career that this pamphlet was written in which the passage referred to occurs. In the extract I am about to make, I will put Clinton's statement regarding Boehm's visit to London in 1833 into italics, so that it may catch the reader's eye should he not be inclined to go through the whole of what follows, for I shall quote at some length, as it will give me an opportunity of explaining how Clinton's belief that Gordon was the originator of the idea of equalised holes and of open-standing keys arose, and of

showing how it was the result, as I have said, of the circumstance that he was not acquainted with the previous history of the flute.

He gives his readers a sketch of the development of the instrument, in which, after mentioning Mr. Miller, who in the year 1810 took out a patent for cylindrical fifes made of metal, he goes on to say: "The first palpable improvement was effected by my late esteemed friend Charles Nicholson, who, by increasing the size of the holes, and altering the diameter of the bore, considerably augmented the volume of tone in the instrument; nevertheless, the radical defects of the old eight-keyed flute, as above stated, were left untouched."

As Clinton thus had no knowledge of the work done by the German school of flute reformers, by whom "the new principle" attributed to Gordon was originated, we can easily understand how it came to pass that he went on to write as follows: "The next improvement we have to notice was the germ of that present complete rearrangement of the flute which has been effected, and resulted from the sagacity of Captain Gordon, who held a commission in the Swiss Guards. He turned his attention to the disposition of the holes, and having made them of equal size, arranged them over the instrument at equal distances. His flute was accordingly well in tune, and the volume of tone on each note was equalised, as far as such a system would allow. He laboured for a considerable time to mature his improvements; but it was not until Mr. Boehm suggested a mechanism for the right-hand part, that his improvement became in any shape available; so uncertain, however, was its action even then, that it was ultimately relinquished as a failure by all parties. It will be necessary," continues Clinton, "here to digress for a short space, in order to give the reader some idea of the fundamental difference between this last improvement in the flute, and the principle of all former ones, which consisted in

these two prime points; first, an entire change in the system of fingering; and, secondly, a change from a shut into an open-keyed instrument; this latter part will need some explanation."

Here follows a digression devoted chiefly to an explanation of what is meant by the open-keyed principle. After this, Clinton goes on to notice Gerock and Wolf's flute. "The effects," he says, "of this new principle were subsequently attempted to be carried out in a more practical shape by the late Messrs. Gerock and Wolf; with an endeavour also to preserve the old fingering;" and after pointing out the drawbacks to this flute he resumes thus:—

"About the year 1832, Mr. Boehm completed a system of improvement upon the flute, which for some time previous he had been constructing; this instrument resembled the Gordon flute, in having its holes at equal distance and of equal size, and being constructed upon the system of open keys. It was supposed, from this resemblance, that Mr. Boehm copied his mechanism from Captain Gordon. The ideas might have been adopted from him, but the general plan was so superior, that I conclude we are chiefly indebted to Mr. Boehm for the first great advance in the knowledge and construction of the flute generally. *It was brought to England and laid before the public, who had an opportunity the following year of hearing the inventor play upon it, and also of examining its merits, it having been offered for sale at Gerock and Wolf's in Cornhill. In 1835, Mr. Boehm again visited London,*⁹⁹ and again played

⁹⁹ According to Fétis (*Biographical Dictionary*, first edition, article 'Boehm'), Boehm arrived in London late in the year 1834, and remained till 1835. "The only information," he says, "I have about this artist is that he repaired to London in the autumn of 1834, and that he was still there in the early months of 1835." Fétis adds, 'Boehm a introduit quelques perfectionnements dans la construction de la flûte, et a inventé un nouveau genre de piano.

upon it several times ; but neither on this, nor his previous visit, did his flute seem to gain the public approbation ; since during his whole sojourn in this country he disposed of but one instrument."

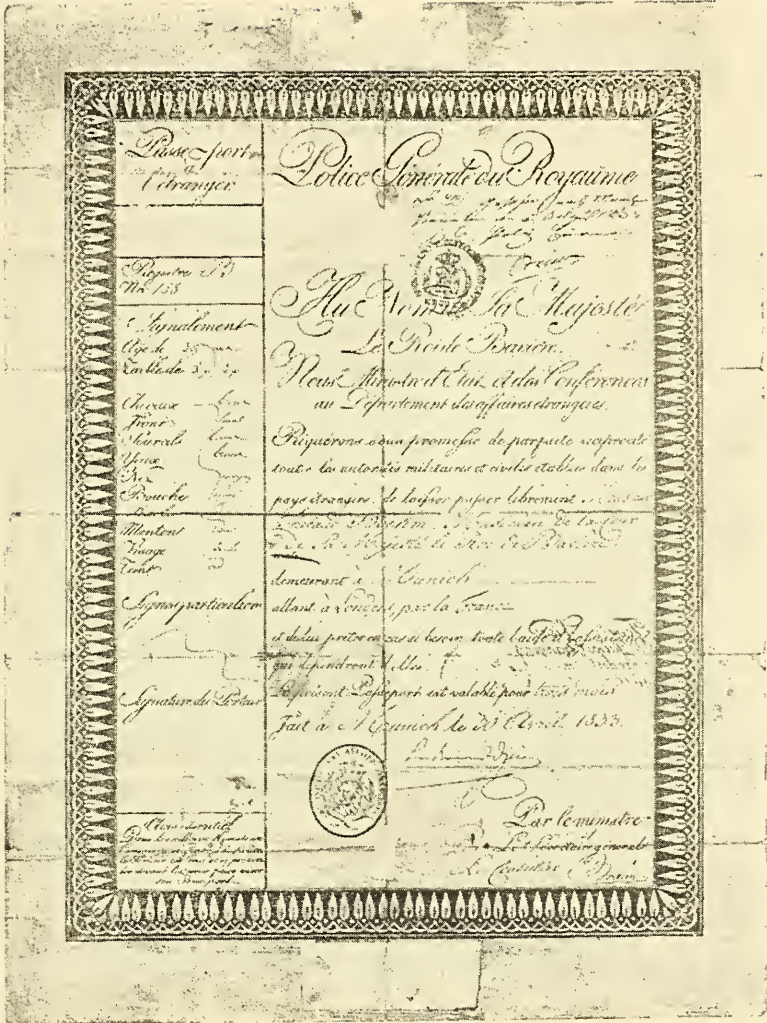
The preceding remarks on Mr. Rockstro's denial of the truth of Boehm's statement that he visited England in 1833 appeared in the second edition of this work, but since that edition was published I have been made acquainted with evidence of the journey having been undertaken, which no one, I apprehend, but Mr. Rockstro, will be disposed to reject. Amongst other old papers in the hands of Herr Ludwig Boehm is the passport¹⁰⁰ with which his father travelled in that year. The *visas* on it show that on the 2nd of May he was making preparations for starting from Munich ; that he had reached Ostend by the 21st, and was about to embark for London on the English steamboat, the *Earl of Liverpool*, Captain Lomax ; that on the 17th of July he was going to leave London to return home through Paris ; that he was in Paris on the 25th of that month, and that he passed through Stuttgart on the 3rd of August.

Lest Mr. Rockstro, who seems to have taken so seriously the Psalmist's too rapid generalisation on the mendacity of mankind, should imagine that the "ruling passion," of which he credits Boehm with being the slave,

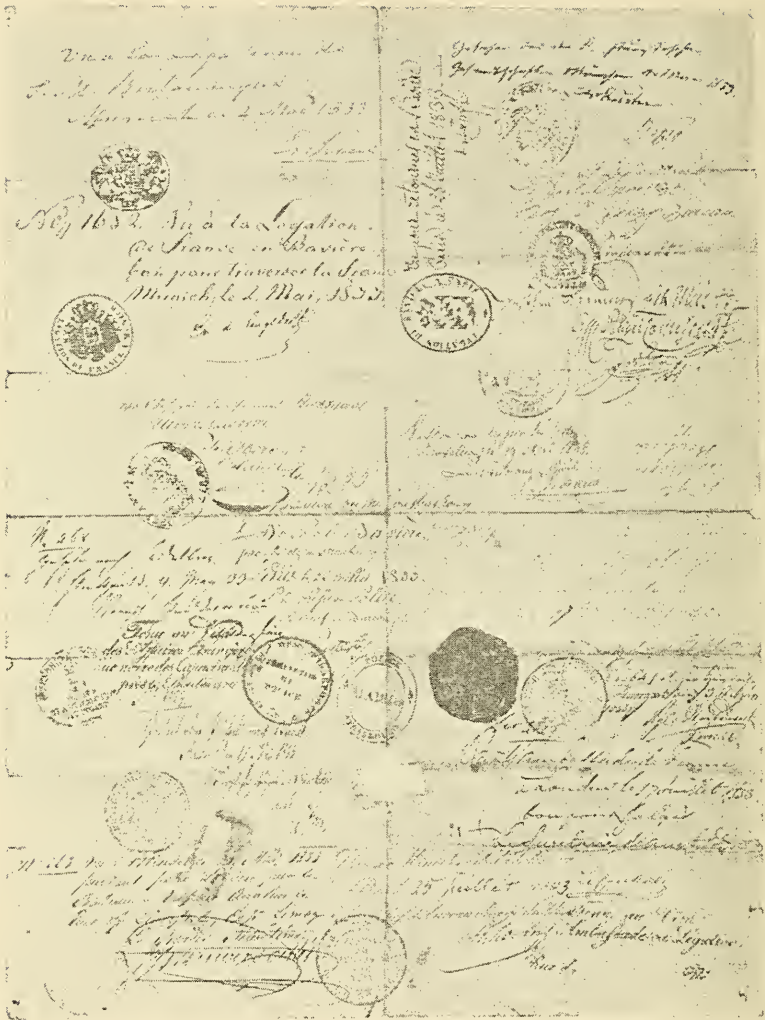
C'est pour faire entendre cet instrument qu'il a fait son voyage à Londres en 1834."



Fétis wrote thus in 1835. From Boehm's passport, however, we get further particulars. We learn that he had reached Calais by the 22nd of July, 1834, and that he did not obtain the visa in London for his return journey until the 27th of June, 1835. An account of his proceedings in England during his visit has already been given at p. 46.

¹⁰⁰ The passports in the possession of Herr Ludwig Boehm are twenty-five in number, nine of them being for England. These nine were issued in the following years : 1831, 1833, 1834, 1836, 1837, 1839, 1845, 1847, 1852. There is no passport for 1851, although it is certain that Boehm was in England in that year.



FRONT OF PASSPORT.



<p>Passport à l'étranger</p>	<p>Police Générale du Royaume.</p>
<p>Registre B N^o 158.</p>	<p>N^o 421. passeport pour Munich Munich le 20 Avril 1833 Paul Jolly Secrétaire</p> 
<p>Signalement Age de 35 ans Taille de 5 p. 3 p. Cheveux bruns Front haut Yeux bruns Nose fine Dentures parfaites Barbe rasée Menton rasé Visage ovale Tête fine</p>	<p>Au Nom de Sa Majesté Le Roi de Bavière.</p> <p>Nous M^{rs} instr^{ct} d'Etat et des Conférences au Département des affaires étrangères.</p> <p>Préqurons sous promesse de parfaite réciprocité sous les autorités militaires et civiles établies dans les pays étrangers, de laisser passer librement, Monsieur Thibaud Prestin, Musicien de la Cour De Sa Majesté le Roi de Bavière demeurant à Munich</p>
<p>Synops particulier</p>	<p>allant à Londres, par la France et de lui prêter en cas de besoin toute aide et assistance qui dépendront d'elles.</p>
<p>Signature du Porteur</p>	<p>Le présent Passeport est valable pour trois mois Fait à Munich le 20 Avril 1833</p>  <p>L. Schneider</p>
<p>Observations Dans les villes où il existe un Commissaire général de police, le Porteur est tenu de se prése- nter devant lui pour faire viser son passeport.</p>	<p>Par le ministre Le Secrétaire général Le Comte de Brunn</p>

FRONT OF PASSPORT.

has descended from father to son, or that the mantle of falsehood, with which he believes him to have been clothed, has fallen on his humble defender, I have asked and obtained the permission of Herr Ludwig Boehm to have the passport reproduced by a copyist whom even Mr. Rockstro will scarcely venture to charge with wilful deception—the sun. Plate III. is a representation on a reduced scale of the front of the document, and Plate IV. of the back, on which the *visas* are written, by an autotype process, which shows the smears and smudges on its surface, the creases where it has been folded, and the slips of adhesive paper by which it was repaired when it was in danger of falling to pieces from the effects of the friction to which it was exposed in the pocket where it was constantly carried. The passport, copied by another process, that of photozincography, which renders the writing somewhat more legible, is given in Plates V. and VI.

It will now be for flute-players to decide for themselves. Shall we accept this facsimile as a proof that Boehm did not lie when he stated that he came to England in 1833, or shall we place reliance on Mr. Rockstro's assertion; "There is no reason to believe that the long deferred visit to England was made prior to 1835;" so "we may conclude" that "his journey was put off from time to time in order that his flute might be completed to his satisfaction, and that he might have time to practise on it before he set out"?¹⁰¹ Ought we to hear the voices from the grave which tell us that the flute which he brought with him, exposed for sale at the shop of Messrs. Gerock and Wolf in Cornhill, and gave Englishmen an opportunity of examining as well as hearing, was the instrument which bears his name; or should we listen to Mr. Rockstro, who maintains that there are no "grounds for believing that the flute on which he played in 1832 and 1833 differed from that" he had

¹⁰¹ *Rockstro on the Flute*, section 598, p. 334.

constructed in London for Messrs. Gerock and Wolf during his first visit to this country?¹⁰²

And now, before dismissing Gordon's flute, I should like to ask a question: Was the instrument of any practical value? Hitherto it has been regarded as the ingenious production of a talented enthusiast, but however clever it might have been, it has always been pronounced by friends and foes alike to be unplayable. Boehm says that it was too complicated to be of any real use; Schafhäutl tells us that it was barely playable in slow movements, whilst in rapid passages it frequently missed altogether; Coche states that its mechanism, composed of cranks and steel wire, provided no security for execution; whilst Clinton informs us in the words I have just quoted, that "it was not until Mr. Boehm suggested a mechanism for the right-hand part, that his (Gordon's) improvement became in any shape available; so uncertain, however, was its action even then, that it was ultimately relinquished as a failure by all parties."

Three of the statements have remained unquestioned for forty or fifty years; but we are now asked to believe that all these gentlemen were wrong. Instead of being complicated, the mechanism of Gordon's flute, we are told, was "positively simple" when compared with that of a popular modern hautboy; so far from giving no security for execution, the action of the crank and wire system "is practically perfect." For confirmation of this statement Mr. Rockstro appeals to Ward's flute; but whilst informing us that Ward used the crank and wire mechanism for closing the two C valves on the foot of his flute, he quite forgets to mention that for the holes closed by the fingers he employed Boehm's ring-keys.¹⁰³

But if Mr. Rockstro has the courage of his convictions, there is an easy way in which he can prove his sincerity.

¹⁰² *Rockstro on the Flute*, section 595, p. 331.

¹⁰³ *Ib.*, section 571, p. 314.

He has the drawing of the Gordon flute, and he professes to know how to finger it even better than Gordon. Instead of continuing to occupy the invidious position of one who heaps obloquy on him to whom he is indebted for the instrument on which he plays, let him have a Gordon flute made, and let him discard the production of the hated and despised Boehm. The pigmy seated on the shoulders of a giant can see farther than the giant, but it would ill become him were he, whilst expatiating on the extent of the view he commands, to kick at the stalwart form by which he is supported. If Boehm is to be criticised by Mr. Rockstro, the fitness of things requires that he should criticise him on his knees.

It now only remains to trace Gordon's visit to Munich to its close. According to Coche's version of the story, on the 15th of July, 1833, Gordon wrote to a friend in Paris, a M. Mercier,¹⁰⁴ telling him that he was about to quit Munich for London, and stating that he had just had made an excellent instrument after his model by a skilful artisan. He enclosed in this letter for distribution in Paris a number of copies of a printed 'Tablature,' i. e. a table of fingering, of this flute.¹⁰⁵ In the 'Tablature,'

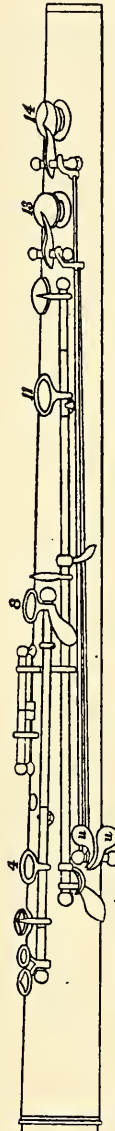


Fig. 45.—Side view of Ward's Flute. Reduced from a figure in the specification of his patent. 4, 8, 11, ring-keys. u, v, ends of keys pressed with the left thumb closing 13, 14, C sharp and C natural valves, the motion conveyed to them by wires and cranks.

¹⁰⁴ A translation of the letter will be found at p. 132 and the original at p. 147.

¹⁰⁵ In the second edition of this work I

or in a preface to it,¹⁰⁶ Gordon, as we have seen, acknowledged his indebtedness to Boehm for the F sharp key, and for the D shake key.¹⁰⁷ There accompanied the 'Tablature' a drawing of the instrument.

Several copies of the 'Tablature' with the drawing thus distributed in Paris by M. Mercier, were placed in Coche's hands;¹⁰⁸ and it is a copy of this drawing which Coche professes to have given to the world as a drawing of Gordon's flute (Fig. 12, p. 107). This is so apparent that Coche does not think it necessary to state it in so many words; but to make assurance doubly sure I questioned Buffet on the point, and he instantly replied that such was the fact. Buffet was perfectly familiar with Gordon's drawing, he had a copy of it with the 'Tablature,' and this he told me he kept until 1851; but when in London on a visit to see the Great Exhibition of that year, he lent it to a French gentleman, by whom it was unfortunately either lost or accidentally destroyed.

Mr. Rockstro states that the "original drawing" of Coche's engraving was sent to Coche by the wife of

gave what I believed to be the title affixed to this *Tablature*, but it was based on the slender foundation of an inference from an expression used by Dr. Schafh utl (see note 6, p. 164). Coche speaks of having received "several drawings and *Tablatures*," but he does not enter into particulars. I have now thought it best to confine myself to Coche's statement.

¹⁰⁶ Was there a preface to the *Tablature*? It is scarcely conceivable that Gordon should have issued a table of fingering without some introductory remarks, and we know that there was a preface to his other table of fingering (p. 99), so that there is every antecedent probability of the existence of a preface. However, all we learn from Coche's words, "*La Cl  du Fa  et la Cl  du Trille de R  appartiennent   Mr. Boehm* (Tablature Gordon)," is that the *Tablature* contained the acknowledgment.

¹⁰⁷ See p. 106.

¹⁰⁸ "Plusieurs dessins et tablatures me furent donn s au mois d'avril suivant" (April 1838), "pour me faire conna tre Monsieur Gordon comme le *premier inventeur*."—Coche's *Method*, p. 2.

Gordon. This is the truth; nevertheless, not being the whole truth, it conveys a false impression. If we are to accept the statements made in Paris, the 'Tablature' and the drawing which Madame Gordon enclosed in her letter to Coche, were nothing but another copy of the printed 'Tablature' and of the drawing, with several copies of which, as I have just mentioned, Coche states that he had been furnished before he received her letter.¹⁰⁹

If we now turn from Coche's narrative to that of Boehm, we come to a point where there appears to be a direct antagonism between their representations. According to Coche, Gordon wrote to M. Mercier as we have just seen, and enclosed the drawing of a flute (Fig. 12, p. 107), with which he was about to quit Munich. Boehm states that Gordon left Munich with a very different instrument, his Diatonic Flute, the facsimile of the 'Tablature' of which has been given opposite p. 102. Here Mr. Rockstro, who has so repeatedly accused Boehm of untruthfulness, suddenly deserts his friend Coche, "assuming the partial accuracy" of Boehm's statement. But if Mr. Rockstro rejects Coche's story and accepts that of Boehm, what becomes of Gordon's letter to M. Mercier? Was this an invention of Coche, the gentleman whom Mr. Rockstro has been accustomed to regard "with feelings akin to reverence"? Or, if it be genuine, what were the printed papers enclosed in it? Were they copies of the 'Tablature' of Gordon's

¹⁰⁹ The letter is given in the Appendix—in French at p. 143, and in English at p. 127.

This letter shows plainly enough that Madame Gordon intended to convey the impression that she forwarded a representation of an instrument made at Munich. She offers to write to Boehm's workman, "with whom he (her husband) made it." She states that it was "this instrument" that her husband cracked when endeavouring to effect a further improvement on it, and it was the drawing and *tablature* of "this instrument" that she says she encloses in her letter to Coche.

Diatonic Flute, not of the instrument which Coche wishes us to accept as Gordon's ?¹¹⁰ Then, again, there

¹¹⁰ It will be remembered that the *Tablature* of the "Diatonic Flute" was preceded by a preface or introduction in which Gordon announced the new instrument "to the Musical World." Although Coche ignored Gordon's Diatonic Flute, a comparison of Gordon's preface with Coche's *Examen Critique*, the pamphlet he presented to the members of the Institute, suggests the idea that he was not unacquainted with the announcement of it, he having seemingly availed himself of the preface in the composition of his pamphlet, expanding Gordon's simple phrases into more highly sounding periods, and clothing his unaffectedly expressed ideas with pompous verbiage. For instance, Gordon begins his preface thus: "The flute, as it is known at the present day, is a very imperfect musical instrument." Coche commences his pamphlet as follows: "Of all musical instruments the flute is the most ancient; it is that of which the use has never been interrupted, and which, nevertheless, has remained always imperfect." In the following the resemblance is more marked; indeed, looking at the sequence of the sentences, it would seem to be not impossible that Coche had a copy of Gordon's *Tablature* before him when he was writing. It will be for the reader to form his own opinion as to whether the correspondence between the two is or is not accidental. I will therefore place, for his convenience, the quotations in parallel columns.

GORDON.

In loading it (the flute) with new keys they have only made it more complicated without changing its defective conformation, the sole way to improve it.

These keys, moreover, as well as the holes, are not in their true place.

COCHE.

Of all the attempts made up to the present time by makers or artists, not one has remedied the primitive defects in the construction of the flute; they still exist in their integrity in the instrument of the present day, overloaded with a crowd of keys which injure its sonorousness, and complicate the embarrassments of the fingering.

The defectuousity of the flute may be attributed to the incorrect placing of the holes, which, since the origin of this instrument, have been pierced according to the natural extension of the fingers. By this

is the drawing Coche published of Gordon's flute. How could this have originated? Did Coche imagine it?

However it came into existence, it is unquestionably a very extraordinary and incomprehensible production.

GORDON.

Many notes have not a sufficient length of column of air, whence, partly, the indecision, the inequality, and the false intonation of the greater part of these notes.

The study of this instrument in its present state is a constant struggle with these defects, which one can succeed in palliating, in disguising more or less successfully, but never in entirely overcoming, because they lie in the structure of the instrument.

COCHE.

system the greater part of the holes do not correspond to the fractions of the column of air that give the acoustic proportions; whence arise the differences in the size and the distance of the holes, and, in consequence, defective and unequal intonations, such as; such are the principal difficulties before which the best artists will always run aground, because these difficulties proceed from defects inherent in the flute.

Gordon's preface has already been given in French in the facsimile of the *Tablature*. For the sake of comparison I append the original of the above quotation from Coche's pamphlet: "Ainsi, de tous les essais tentés jusqu'à présent par des facteurs ou des artistes, aucun n'a remédié aux vices primitifs de la construction de la flûte; ils existent encore intégralement dans l'instrument actuel, surchargé d'une foule de clés qui nuisent à sa sonorité et compliquent les embarras du doigté.

On peut attribuer la défectuosité de la flûte au placement inexact des trous, qui, depuis l'origine de cet instrument, ont été percés d'après l'écartement naturel des doigts. Par ce système, la plupart des trous ne correspondent pas aux fractions de la colonne d'air que donnent les proportions acoustiques; de là naissent les différences dans la grandeur et la distance des trous, et, par suite, des intonations vicieuses et inégales, telles que; telles sont les principales difficultés devant lesquelles les meilleurs artistes échoueront toujours, par ce que ces difficultés proviennent de défauts inhérents à la flûte."

I will examine one key only, that for closing the B natural hole ; a key which we have already had occasion to discuss from another point of view. It is indicated in the drawing by the letter *e* (see p. 107). Judging from the way in which it is depicted, it would seem to have been the intention of the draughtsman to represent this key as working on the axle *f*. But if this were so, the finger would open instead of close, as it ought to do, the valve *e*. It is true that flute-makers are familiar with a device by which the action could be reversed, but such mechanism could not be placed on the flute without it being visible.

Mr. Rockstro proposes a different explanation. He considers that instead of working on the axle *f*, the shank of the key passed clear over this axle. But we are thus only landed in a still greater difficulty, there being no axle shown on which the key could have worked. Mr. Rockstro says that the axle must have been at or near *h*, "perhaps under the crescent." But even if we assume that it would be possible for it to have been so concealed by the crescent as not to be visible to the eye of the draughtsman, our difficulties are not lessened by Mr. Rockstro's explanation ; for had it been placed at *h*, no action could have been obtained on pressing the finger on the crescent, as the pressure of that part of the finger which was above, would neutralise the pressure of the part which was below the axle, half the force being applied to the lever on one side and half on the other side of the fulcrum. Thus it is open to a Boehmite, should he condescend to adopt the tactics of his opponents, to say that the person who made the drawing, by one of those strange oversights by which so many attempts to deceive have been brought to light, has depicted a key, which either opens the hole it ought to close, or else has no attachment to the flute.

That Coche was not free from certain of the proclivities with which Mr. Pecksniff's name is usually asso-

ciated is only too apparent on his own showing,¹¹¹ but God forbid that we should allow him, now that he is no longer able to explain or defend himself, to be pronounced guilty of forgery on such evidence as this, or on the authority of Mr. Rockstro's assumption. And as regards the seemingly conflicting statements of Coche and Boehm, surely, instead of striving to prove that one of two dead men must be an Ananias, to most minds it would be a more congenial task to endeavour to ascertain if some means could not be found of reconciling what seems contradictory. Why, for instance, should not Coche and Boehm both be right? Who can say that Gordon did not leave Munich with two flutes; that which Coche produced, and that which Boehm brought forward? Boehm designed two flutes, one on which he sought to retain, the other on which he abandoned the old fingering. How can we tell that Gordon too might not have wished to have two instruments, an improved old, and also a new flute? Tulou had condemned his change of fingering. Schafhäütl speaks of him as wedded to an eight-keyed flute; whereas Gordon's flute, as figured by Coche, is a still greater departure from the old flute than is the Boehm. Indeed, it would seem to be far from impossible that Schafhäütl saw the two flutes in Boehm's workshop, for, in describing Gordon's flute, he mentions things peculiar to each of the instruments.¹¹²

I was once in a position which would have enabled me, I have little doubt, had I availed myself of the opportunity, to make known far more on this subject than Boehm had previously thought proper to publish. It was on the occasion of my first interview with him. He was sitting alone expecting my visit when I entered the room. Whether or not he was gifted with the faculty of second sight, and had been mysteriously warned that one was approaching who was destined to tell the story

¹¹¹ See p. 71.

¹¹² See Appendix, p. 164, note 6.

of his flute I cannot say ; but certain it is that, although I was a perfect stranger, in the very breath in which he greeted me, he began with singular abruptness to speak of Gordon. He was in a communicative mood, and was evidently desirous of going fully into the story. But his words fell on deaf ears. At that time I little thought that I should ever interest myself in Gordon or his flute. I paid no heed to what he said ; I was only thinking of how to lead the conversation to another subject on which I was anxious to have his opinion.

Is history a record of facts, or a product of the imagination ?

How often has this question forced itself on those who endeavour to ascertain the truth or falsehood of the narratives with which its pages are filled. We have just seen how difficult it is to sift fact from fiction in the statements made in the past respecting the origin of the Boehm flute. And now, in the year of grace 1891, there has appeared a new and totally different version of the story.¹¹³ Whether this fresh addition to the literature of the subject is more, or less credible than Mr. Rockstro's account, whether the evidence on which it is based is better or worse, I shall leave others to decide.

To such a degree has the march of events been quickened in these days of railways and telephones, that the Boehm-Gordon incident has already reached the stage of myth. Boehm, it is true, has not been identified with Marsyas, nor Mr. Rockstro with Apollo. The azure sky, the mountain breeze, and the brawling of the Nysæan torrent are conspicuous by their absence. The story has taken the form of a medieval legend ; we smell brimstone and catch sight of blue flames.

So incredible does it appear that any human being could have inflicted on his fellow mortals the maddening task of attempting to master the difficulties of the Boehm

¹¹³ See the *National Observer*, Jan. 17, 1891.

fingering, that it has come to be believed that this fingering must be the invention of the Enemy of Mankind. The legend presents points of resemblance to that of the Devil and Dr. Faustus with which poets and dramatists have made us so familiar. Boehm, like Faust, sold his soul, not, however, for a beautiful woman, but for a new flute. Gordon becomes a Mephistopheles, Satan disguised as an angel of light.

How the tempter first assailed his victim is as yet a mystery. Whether he revealed himself in a vision of the night, as he did to Tartini, and ravished Boehm, whilst he slept, with a supernatural flute solo; whether he appeared to him as he was struggling, file and hammer in hand, to construct some new key by the dim light of a midnight lamp; or whether, to disarm suspicion, he introduced himself by broad daylight at Messrs. Gerock and Wolf's in the simple guise of an ex-officer of the French army, are still matters of conjecture. But wherever might have been the scene of the preliminary negotiations, it was not in a murky den of this crime-stained Babylon, nor in some quiet recess of Boehm's peaceful home that the bargain was finally struck. It was on a blasted heath that the unholy bond was signed, sealed, and delivered. Here 'midst the crashing and flashing of thunder and lightning, the hurtling of hail, and the hoarse cry of the storm-fiend, the Boehm flute was ushered into the world.

Mr. Rockstro will be delighted to hear that Boehm, whom he believes to have imposed on so many thousands of flute-players, proved to be no match for the Old Gentleman. Gordon, less honest than the Mephistopheles of Faust, having secured the reversion of Boehm's soul, palmed off upon him in return an instrument with a well-nigh impossible fingering. On discovering that he had been duped, the selfish and mercenary Boehm, instead of burying the accursed model deep underground, proceeded to console himself for his bad bargain

by disposing of it to confiding brother flautists ; thereby entailing on the world of flute-players greater ills than those which afflicted mankind on the opening of Pandora's box.

The legend as I shall present it to the reader has been wafted from far Samoa. It comes from a very distinguished pen, that of Mr. Robert Louis Stevenson, who has thrown it into verse, as follows :—

TO THEOBALD BOEHM, FLAUTIST,

(Inventor of the New Fingering which bears his Name).

AN AUTOBIOGRAPHICAL REMINISCENCE.

As o'er your flageolet we lean,
 Mark your two D's—
 The sharps, I mean—
 And tell me, how came these
 In that relation ?
 Or take your A's—
 You've three of those
 Attained in the most diverse ways
 Plainly to drive the virtuose
 To desperation—
 You surely cannot mean me to suppose
 This strange derangement sprang from calculation ?

Was it in dream,
 O Boehm,
 You saw these keys that seem
 So singularly mingled ?
 The Devil doubtless, on some lonely track,
 While the rude wind swept by you with a hiss
 And on your back
 The hailstones tingled,
 Met you by assignation, and displayed
 Three models¹¹⁴ diabolically made :
 From which (being all amazement) it was this
 You rashly singled.

¹¹⁴ The three models, from which Boehm selected one, are mentioned at p. 24 of this work.

One moment in your soul (which you had sold)
 Joy doubtless glowed
 As, pipe in hand, you took the road
 Towards your plain abode
 In some unknown and old
 And spiry German city.
 Joyful, no doubt, you sat you down
 And trimmed your light,
 And to the drowsy murmur of the town
 Prepared to charm the night
 With some old ditty.
 One moment only : then the whole
 Infernal cheat
 Dawned on your soul,
 And you broke forth in words I can't repeat,
 Or with a groan
 Sat turned to stone :
 Iago, O, the pity !

Say, Boehm, long dead, long damned,
 What did you then,
 When you beheld yourself thus bammed,¹¹⁵
 The most beguiled of men
 Since Hell could over-reach ?
 Say, did you put your sentiment in speech
 Or fear to say it ?
 Say, did you hurl to ground
 That most unsound
 Fallacious flageolet,
 And set
 Your foot upon 't, to bray it ?
 It may be. Fancy trembles to conceive
 The doings of that eve,
 Your rage, your pain,
 When, in a clap of thunder, you saw plain
 You had your pipe, dear bought, and bought in vain—
 You had your pipe, and you could never play it !

How long, O Boehm, before
 Hope, like the sunshine in a shady place,
 Revived ? and could restore
 The glory to your face,
 Glory so bright that never bard could tell it ?

¹¹⁵ "*Bammed*," an abbreviation of bamboozled.

How long before that thought
 Burst on you in a jet?
 And your proud back you bowed,
 Picked up that dearly bought
 Still precious flageolet,
 And cried aloud:
 "I cannot play, by God, but I can sell it!"

And now, having disposed of Boehm and Gordon, I will say a few words on a subject of more importance to us than a flute-makers' paltry squabble—the connection between science and the construction of our instrument.

In these days of enlightenment every man seems to be proud of science, but ashamed of art. Makers and compounders of every sort and kind fancy that they can lift themselves above the level of their fellows by holding on to the skirts of Faraday, Tyndall, or some other man of science. Every article touters invite us to purchase is a scientific production; every *nostrum* we are advised by quacks to swallow is a scientific remedy. Indeed, so universally has science become diffused, that she has found her way to our nether garments, and has even descended into our boots.

But leaving such mysteries as these to scientific trouser-cutters and scientific shoemakers, let us ask this question: Is the science of acoustics as yet sufficiently advanced to admit of its discoveries being applied to the art of flute-making? "It is easy," as Clinton says, "to show how the vibrations and the waves of air in the flute are governed by the laws and principles of acoustics; and to the uninitiated ear it smacks in some degree of learning," but to what extent does it assist the flute-maker? In order to obtain an answer to this question we will see what help the flute-maker can get from science in settling the five most important considerations which claim his attention in constructing a flute, viz. :—the material of the instrument, its bore, the place for its

cork, the configuration of its embouchure, and the position of its finger-holes.

First as regards the material. Does the material of which the flute is made affect the tone of the instrument?

Boehm tells us that flutes made of hard German silver give a clear but shrill tone, inferior to that produced by tubes of brass or silver; and he further states that, in comparison with these, "the tone of flutes made of wood sounds literally wooden."¹¹⁶ Now is, or is not this distinction in the quality of the tone an illusion of the sense of hearing?¹¹⁷ M. Victor Mahillon regards it as a blot on Boehm's reputation that he was unable to emancipate himself from such old prejudices and accept the teaching of his own theory that it is the air alone that vibrates in the flute.¹¹⁸

¹¹⁶ *Essay on the Construction of Flutes*, p. 45.

¹¹⁷ To test the question of how far the tone of a wind instrument is influenced by the employment of metal or wood as the material of which it is made, M. Victor Mahillon constructed a cavalry trumpet of wood, with the result that it yielded precisely the same bright, shrill, brassy, ringing sound as the ordinary metal trumpet; indeed, no difference could be distinguished in the *timbre* of the two instruments. See his *Éléments d'Acoustique*, p. 64.

Those who remember the introduction of the silver flute will recollect that its opponents expressed a most violent dislike to its tone. To meet them, it was usual to place a flute-player behind a screen, or in an adjoining room, where he was to play alternately on a wood and a silver flute, and to ask them if they could say with certainty, without seeing the instrument, on which of the two he was playing. To such an extent did flautists of the old school allow themselves to be influenced by prejudice against flutes of metal that Edward Marshall of Oxford, a pupil of Nicholson, and a good professional player on the eight-keyed flute, having at one time become subject to fancies, and imagining that he was about to die, once said to the author, "I shall soon be in Heaven, and then I shall play on a golden flute, but mind," he added, raising his voice and speaking with great energy, "it must be lined with wood."

¹¹⁸ That Boehm held the opinion that the vibration of the material of the flute is an essential factor in the production of the tone is

How is the bewildered flute-maker to decide between these two authorities? Has Sir John Herschel, Lord Rayleigh, Sir George Airy, or any other scientist come to his rescue, and demonstrated for him whether or not the difference in tone alleged to exist between a silver and a wood flute is real, or imaginary? No! he is left to what "will naturally be supposed"; and he is further told that "attempts to argue theoretically on questions of this kind are almost useless."¹¹⁹

Secondly, there is the bore of the flute. Is the flute-maker indebted to science for its form and proportions?

Let us hear what Mr. Rockstro has to say. "As far as I have been able to discover," remarks that gentleman, "all improvements that have ever been effected in the bores of wind instruments have been absolutely empirical."¹²⁰

The diameter of the widest portion of the bore of the flute is to this day six-eighths, or $\cdot 75$ of an inch, just as it was when the primitive, keyless tube figured at p. 218 was made,¹²¹ long before science had demonstrated the nature of the undulations of the column of air the bore encloses. For the bore we now use, the combination of the cylindrical body with the tapering head, we are

evident from a passage in his *Essay on the Construction of Flutes*, p. 26. "In order to obtain the sound of a wind instrument, the column of air within the tube must be brought into certain vibrations, different from those of strings, tuning forks, or metallic springs. These vibrations must react upon the body that surrounds the air column, and excite its molecular vibrations, without which no sound can arise." In his later work Boehm uses this theory to explain the ease with which the tone of a silver flute can be elicited, referring it to the small quantity of material required to be thrown into vibration.

¹¹⁹ *Rockstro on the Flute*, section 247, p. 95.

¹²⁰ *Ibid.*, section 341, p. 162.

¹²¹ I ought to mention that this measurement was not taken with an instrument capable of measuring millimetres, such as flute-makers use. I had only an ordinary tape for the purpose.

indebted wholly and solely to the "ignorant impostor," the last rag of whose science, we are told, has been torn from his back by the spasmodic clutching of well-meaning but hysterical admirers. Five-and-forty years ago Boehm made hundreds of patient experiments to ascertain the best form and proportions for the bore, and if some flute-makers have departed slightly from what he recommended, it has not been in obedience to the dictates of science. The floods of scientific light which have been poured on the production of sound in tubes have left no mark on the bore of the flute. Science has not touched the bore with her little finger.

The third point is the position of the cork, or stopper.

Have we now at length reached the domain of science? It would seem so to judge from the way she has applied herself to enlighten us on the nature of the undulations of the air in tubes open, and tubes stopped at one end. If she has so much to say on this subject, surely she can tell the flute-maker where to put his stopper. But no! it is by "experiment"¹²² that the position is ascertained which gives the best results. Indeed it is not to Dame Science, but to Lady Chance¹²³ that we are indebted for the discovery that the position of the stopper exercises an influence on the harmonics.

Madame Science can talk by the hour about the oscillations to and fro of the particles of air confined in tubes. She can discourse of their condensations and their rarefactions, of their reflexions positive and negative, of their nodes and of their antinodes; she can even reveal to our wondering eyes the secret gambols of their mystic dance. But when we ask her to give us an

¹²² *Rockstro on the Flute*, section 331, p. 155.

¹²³ "Le hasard fit découvrir qu'en établissant une cavité à la gauche du trou d'embouchure, le partage du tuyau nécessaire à la production des harmoniques, s'opérerait en établissant le rapport nécessaire entre les uns et les autres."—Mahillon, *Éléments d'Acoustique*, p. 192.

account of the behaviour of the column of air between the cork and the mouth-hole, she is silent. Instead of being able to teach, she still has everything to learn. Mr. Rockstro has been poring over books of science for thirty years, and all that he has been able to extract from them on the subject amounts to this, that the vibrations in this column of air "appear to be somewhat similar in their nature to those which extend beyond the lower end of the instrument, and to be even less understood."¹²⁴

Fourthly, there comes the embouchure.

What a mystery have we here! The embouchure is the larynx of the flute; nay, it is its very heart. It is the embouchure which quickens the pulse whose fluttering throb endows the dead stick with the gift of speech, and transforms it into a living being. It would be indeed strange if so wonderful an organ had not attracted the attention of Science; accordingly, we find that amongst those whom she has deputed to lay bare its secrets are some of the most able of her sons. Are they agreed on the nature of its functions? We will again appeal to Mr. Rockstro. "There is probably no subject," he declares, "in the whole range of the science of acoustics on which greater uncertainty and diversity of opinion prevail."

The last addition to these scientific speculations is the clever contribution of Mr. Hermann Smith, but Mr. Rockstro throws doubts on its soundness. Sir George Airy says that this obscure matter demands more complete investigation, Lord Rayleigh speaks of our ignorance as to the mode of action of the wind, and Helmholtz expresses a hope of being able to investigate it more extensively. Instead, then, of having so far reached the deductive stage as to be able to formulate laws for the guidance of the flute-maker, it is possible that the science of the embouchure has not yet advanced from hypothesis into theory.

¹²⁴ *Rockstro on the Flute*, section 338, p. 158.

Boehm was fully alive to the importance of the embouchure. He made its shape, its size, its depth, and the angle at which it should slope, the subject of his experiments. Mr. Rockstro, too, has his ideas as to its form, but they do not agree with those of Boehm. On this uncertain topic Boehm is satisfied with telling us what he *thinks* best adapted to the purpose, and what "according to" his "views" is "most suitable,"¹²⁵ and giving us his "opinion"¹²⁶ for what it is worth. But what is doubtful to Boehm is obvious to Mr. Rockstro. He rushes in where Boehm fears to tread, and presents us with a diagram of a "perfect" embouchure.¹²⁷ But from the nature of the case its perfection is of the *must-be* order, not the offspring of applied science.

Finally, we have to consider the position of the finger-holes, and here, at last, we enter on debatable ground.

Boehm, who prided himself far more on his knowledge of science, to acquire which had cost him so much time and trouble, than on the mechanical gifts with which he had been so liberally endowed by nature, used his utmost endeavours to place the position of the finger-holes on a scientific basis. He embodied the result of his labours in a *Schema*, or *Diagram* for the use of musical instrument makers in tuning their instruments, and in this *Schema* the position of the finger-holes was made to depend on a calculation of the wave-length of the column of air.

It appears, however, that the belief—a belief in which I confess that I once shared—that flute-makers make use of the *Schema* is erroneous. M. Cavallé-Coll states that the best flute-makers he has consulted have admitted that to get at the position of the finger-holes they feel their way by repeated trials. As far as I have been able to learn, Messrs. Rudall, Carte, & Co. are guided

¹²⁵ *The Flute and Flute Playing*, translated by Mr. Triggs, ch. 2.

¹²⁶ *Essay on the Construction of Flutes*, p. 38.

¹²⁷ *Rockstro on the Flute*, section 336, p. 157.

by experiment and the results of experience, whilst Mr. Rockstro arrives at the position of two or three of his holes by "direct experiment," and then, to save time and trouble, has recourse to a geometrical calculation, taking these holes as *data*, to find the place of the others.¹²⁸

But if a flute were constructed with its holes placed where Boehm's *Schema* requires, would it prove a well-tuned instrument? On this point opinions are divided.

It is, of course, needless to say which side Mr. Rockstro would take on such a question. Mr. Rockstro knows of two attempts to construct a flute according to the *Schema*. They were made by gentlemen whose names he does not think it necessary to mention, but one of them was an eminent flute manufacturer. The failure of both experiments was complete. Mr. Rockstro has already pronounced Boehm's efforts in flute-making to have terminated in the production of an object of "disgust"; "an inherently imperfect thing," "most wretched" in tone and tune, "lamentably," "extravagantly," and "outrageously" bad. But the vocabulary of vituperation is not exhausted. So horrible, shocking, and dreadful was the result of his experiment, that it was declared by the eminent but anonymous flute manufacturer to be "ghastly."¹²⁹

M. Cavallé-Coll, however, has come to a very different conclusion. This gentleman was deputed by the jury to examine Boehm's *Schema* when it was sent to the Paris Exhibition of 1867. He reported that it was vitiated by a fundamental error; Boehm had miscalculated the length of the sound-wave. The matter dropped; but after the lapse of fifteen or sixteen years M. Cavallé-Coll's attention was again drawn to the subject. Thereupon he borrowed, and proceeded to measure a silver

¹²⁸ *Rockstro on the Flute*, section 350, p. 170.

¹²⁹ *Ibid.*, section 349, p. 169.

flute on the Boehm system on which M. De Vroye was playing. To his surprise he discovered that it corresponded exactly to the proportions of the *Schema*, not only in the length of the tube, but even in the position of the finger-holes. On reflection, he became convinced that his statement that Boehm had miscalculated the length of the sound-wave was the result of an oversight. Temperature exercises an influence on the sound-wave, as every flute-player knows to his cost, and M. Cavallé-Coll had omitted to notice that Boehm had based his calculations on the length of the sound-wave in air at the temperature to which the interior of the flute is raised by the breath of the performer. This led him to reconsider the whole question, and the conclusion at which he arrived, as stated in a paper which he published,¹³⁰ was that the *Schema* is perfectly correct, and that it satisfies all the requirements of the flute-maker.

On the other hand, Dr. Schafhäutl states¹³¹ that the problem involved in the position of the finger-holes is so complicated that the attempts made to solve it, though they come near, have not *as yet* reached reality. Whenever Boehm attempted to make flutes with the side-holes placed according to his (Schafhäutl's) calculations, there were always a few vibrations in excess or defect. *Empirical formulæ*, the Doctor goes on to say, *alone can help here*. So, too, M. Victor Mahillon, speaking with the double authority of a flute-maker and a writer on acoustics, informs us that a study of the work in which Boehm made his principles known has convinced him that Boehm either did not carry out his theory in his practice, or else did not completely divulge the result of his researches. An organ-pipe, he admits, can be made the subject of scientific calculation, but not the tube of a flute. Not even for its length, much less for the position

¹³⁰ This paper is reprinted in this work, p. 306.

¹³¹ *Infra*, p. 464.

of its finger-holes, do the figures prove absolutely correct. The results are approximative only. Theory and practice, he adds, do not agree ; an admission, as it is needless to point out, that the true theory, as far as the flute is concerned, has still to be ascertained, or that a second theory is required to account for the residual phenomena, the nature of the disturbing influence and the laws which govern it having still to be studied.¹³²

If, then, there is not one of these five departments of

¹³² " Nous avons dit que les lois des longueurs ne donnent que des résultats approximatifs. Il suffit, en effet, de comparer ces chiffres avec la longueur réelle de la flûte et la position de ses trous latéraux pour se convaincre que la théorie n'est pas d'accord avec la pratique. Cette divergence existe non seulement pour les tuyaux de la flûte, mais pour toutes les colonnes d'air en général. En 1860, M. Cavallé-Coll, le célèbre facteur d'orgue, présentait à l'Académie des Sciences de Paris une formule qui permet de calculer d'une façon exacte la longueur d'un tuyau d'orgue. Cette formule appliquée aux tuyaux cylindriques est la suivante :

$$L = \frac{V}{N} - D \frac{5}{3}$$

dans laquelle L représente la longueur du tuyau, V la vitesse du son, N le nombre de vibrations, D le diamètre. Cette formule n'est pas applicable au calcul de la longueur d'une flûte traversière ; l'embouchure de celle-ci, par sa position sur la paroi latérale du tube et par son diamètre inférieur à celui de la section du tuyau, abaisse le son plus que le fait la bouche des tuyaux d'orgue ; par suite de cette conformation d'embouchure, le tuyau de la flûte traversière se range parmi ceux que l'on désigne sous le nom de *tuyaux partiellement bouchés*. De plus, la partie de la flûte comprise entre le trou de l'embouchure et le bouchon qui sert à opérer la fermeture supérieure du tube, agissant en *tuyau fermé*, doit compter pour double dans l'évaluation de la longueur totale de la flûte. Cet espace compris entre le bouchon et le centre de l'embouchure est en moyenne de 0^m 017. Dans ces concitions il est difficile de calculer avec une précision absolue la longueur de la flûte. Le calcul de la position exacte des trous latéraux est plus compliqué encore."—Mahillon, *Étude sur le doigté de la Flûte Boehm*, p. 8.

his art in which the flute-maker can press acoustics into his service, and use her as his handmaid to assist him in his difficulties, where, it will be asked, is the flute-maker's science? The flute-maker's science is as yet unborn. She is waiting for some competent investigator to bring her into the world by devoting himself to the problems which have still to be solved before she can see the light. But whoever he shall be that may undertake the task, it will be for him to bear in mind that to the student of Natural Science—and the most distinguished scientific man is but a student—there is no *must-be*. His first lesson is Humility. At every step he doubts and tries; then doubts and tries again. There are domains of thought which the *must-be* gentlemen can claim as their own, but these gentlemen have no place amongst the workers in the field of inductive science.

One other word—a word on behalf of my younger and less experienced brother amateurs.

It is high time that a protest should be raised against the practice of dangling before the eyes of flute-players the bait of perfection—a practice by which so many of us have been induced to lighten our pockets and waste our time, only to discover that we have been invited to grasp at a will-o'-the-wisp.

How often have we been mocked by this illusion even within the memory of men still living! First came Coche. He, however, was far too clever to claim perfection in his own name. They manage such things better in France. He was able to bring forward Berton, Cherubini, Paër, Auber, Halévy, and Carafa as sponsors for the statement that in his flute were to be found "perfect intonation and equality of tone."¹³³ These distinguished composers, though they were ready to vouch for the fact that all the faults of the old flute had been corrected, did not profess to be competent to

¹³³ See Berton's letter to Coche, and the report of the *Académie Royale des Beaux-Arts*, pp. 118 *et seq.*

explain, of their own knowledge, in what these imperfections consisted.

They represented that they had obtained their information on the subject whilst "chatting" with a gentleman yclept the celebrated Charles, a gentleman who combined the accomplishments of a great physicist (*grand physicien*), a distinguished amateur of music, and a "pretty good" flute-player. Unfortunately, however, the great physicist betrays such ignorance of the acoustics of the flute that even Mr. Rockstro cannot help laughing at him, and as for the vaunted perfection of Coche's instrument, that gentleman informs us that in intonation it was almost as defective, and in tone decidedly inferior to "the inherently imperfect thing" turned out at Boehm's factory at Munich.

Next comes Siccama. He reduces his right to the throne of perfection to a mathematical demonstration. The passage in which he brings forward his claim is quoted in these pages,¹³⁴ and Mr. Rockstro has been so complimentary as to repeat it in his 'Treatise on the Flute.' Mr. Rockstro makes short work of Siccama. He pronounces his Diatonic flute to be "an unphilosophical and unnatural combination of two incompatible things," and so far was it from attaining perfection, that "its third octave," we are told, "was almost irredeemably bad."

Siccama was followed by Clinton. When Clinton first became a flute-maker he spurned the idea of perfection. "No flute is perfect," he said, "nor can be; the principle by which we obtain the sounds of thirty-seven pipes, varying in length and size, from one single tube, precludes the possibility of perfection." But alas for consistency! A few years afterwards Mr. Clinton brought out a new model to which he gave the name of the Equisonant flute, and at the same time he pro-

¹³⁴ *Supra*, p. 17.

ceeded to assure the world of flute-players that he had obtained an instrument "perfect in tone and tune."¹³⁵

The Equisonant fares even worse at Mr. Rockstro's hands than does the Diatonic flute. He makes merry over it. A facetious gentleman, he informs us, once asked Mr. Clinton if Equisonant did not mean equally bad all over. "Unfortunately," adds the witty Mr. Rockstro, the instrument "had not even that negative merit, it was unequally bad."

And now I come to a circumstance which seems well-nigh incredible. So irresistible appears to be the temptation to which flute improvers are exposed to claim perfection that the very man who has been denouncing and ridiculing the perfection of others, having thus cleared the ground, steps into the vacant place. Mr. Rockstro, who denies that Perfection ever deigned to bestow a glance on those of his predecessors who boasted

¹³⁵ "My endeavour has been to obtain an instrument worthy of its class ; perfect in tone and tune ; equal in all the keys of music ; to secure that corresponding equality in the three octaves which has hitherto been so difficult and apparently so hopeless ; and lastly, to combine with it that simplicity of fingering without which all our efforts to obtain fluency and certainty of execution and expression must prove ineffectual. I have no difficulty in showing that in these particulars my labours have been attended with complete success."—Clinton's *Hints to Flute Players*, p. 23.

When, in reliance on these representations, I purchased of Mr. Clinton one of his Equisonant flutes, I had not read the work in which the following occurs. In this extract I have taken the liberty, with many apologies to the City Editor of *The Times*, of interpolating the word *flute*. "Do not listen to what other people have to recommend. People who are engaged in commerce in all its multifarious ramifications care only for themselves, and for no other single soul ; it is at all times consequently idle to put any other construction upon advice to buy a certain *flute*, tendered apparently with the most benevolent motives, than that it is to serve directly or indirectly the purpose of him who recommends the purchase. In business every one is for himself, and, as the saying is, 'the devil take the hindmost.'"—*Crumph on the Theory of Stock Exchange Speculation*, p. 59.

that they had enjoyed her favours, is as certain that the coy Goddess has descended from heaven to take up her abode with him, as was Endymion that the chaste Diana came down from the clouds to crown with bliss his amorous slumbers.¹³⁶

It would be useless to deny that it was a source of regret to more than one of Mr. Rockstro's well-wishers to find that a work we were all so ready to welcome into the world, a work which, when it appeared, proved to be rich in the fruits of observation and research, and distinguished by a literary style for the excellence of which we were not prepared, had been made the vehicle for such pretensions. Indeed it was not long before the author himself had cause to repent him of his indiscretion. An American reviewer¹³⁷ of his 'Treatise on the Flute,' not content with charging him with denouncing Boehm and his work in order to heighten the value of his own, pronounced his ponderous volume to be "one of the most stupendous advertisements in book form of modern times," and called attention to what seemed to his 'cute transatlantic mind to be a master stroke of smartness, that the "advertising scheme" was carried out "all at the expense of a large and respectable list of subscribers named in the last pages."

"O wad some power the giftie gie us
To see ourselves as others see us!
It wad frae monie a blunder free us,
And foolish notion."

In conclusion, I can only express a hope that when Mr. Rockstro has gone to his long rest, when the pen has fallen from his clay-cold hand and his tongue is silent for ever, his memory may meet with more tender treat-

¹³⁶ *Rockstro on the Flute*, section 681, p. 393, section 703, p. 413 : section 367, p. 186.

¹³⁷ See *The Leader*, a monthly musical journal published at Boston, for January 1891.

ment than that which he has accorded to those who have preceded him in the path he is treading. I do not say, may he not be assailed as he has assailed Boehm, for such an attack would only recoil on him by whom it was made. But may no future improver of the flute who proceeds to tear the perfection of others to tatters, and then to set up his own, use him as a butt for sorry jests, as he has jeered at Clinton sleeping in his quiet grave, or point at him the finger of scorn, and describe him as he has described the dumb and defenceless Siccama, of whom he has not scrupled to write: "About the year 1842 he conceived the unfortunate idea that he was destined to be the inventor of a new flute that should eclipse everything that had been made or imagined. Having become imbued with this notion, he set to work with all the vigour of an energetic nature. He had little knowledge of the flute and less inventive genius, but he determined to bring out a flute associated with his name, and he did so."

M. CAVAILLÉ-COLL
ON
BOEHM'S SCHEMA.

FROM THE 'ÉCHO MUSICAL' OF BRUSSELS FOR JANUARY II, 1883.

LORS de l'Exposition universelle de Paris en 1867, Monsieur Théobald Böhm fit appel à l'attention du jury de la classe 10 sur un Schéma ou diapason pour la construction des flûtes de son système intitulé (par lui): *Illustration graphique de la gamme moyenne, d'après le diapason normal et de la progression géométrique pour mettre d'accord ces proportions avec chaque diapason.*

Le jury des instruments de musique nous ayant confié la mission d'examiner ce Schéma, une note rédigée par nous sur ce nouveau travail de Böhm a été publiée in extenso dans le rapport du jury de la classe 10 ('Instruments de musique,' tome deuxième, pages 280 et 283).

Dans cette note, nous faisons remarquer que la base du diapason de Böhm donnait des longueurs d'onde trop grandes par rapport au ton normal français de 870 vibrations par seconde, à la température moyenne; que la longueur d'onde du la_3 normal est de	0 ^m 391
tandis que la longueur indiquée sur le Schéma de Böhm est de	0 ^m 398
soit une différence en plus de	0 ^m 007
et si nous comparons la longueur d'onde de l' ut_3 grave de la Flûte, nous trouvons sur le Schéma une longueur d'onde de	0 ^m 670
au lieu de l'onde du ton normal de	0 ^m 657
soit une différence en plus de	0 ^m 013

En terminant nous faisons remarquer que malgré ces différences qui pourraient résulter de la vitesse du son que l'auteur du Schéma aurait pu prendre pour base, on devait reconnaître que cette échelle graphique des divisions de la gamme avait été établie par l'auteur avec beaucoup de soin et d'une manière rationnelle ; tandis que jusqu'alors, et de l'aveu même des meilleurs facteurs que nous avons consultés, leurs instruments avaient toujours été faits expérimentalement et par tâtonnements.

Depuis l'Exposition de 1867 nous n'avions plus entendu parler du Schéma de Boehm, alors que dernièrement notre ami, Monsieur Victor Mahillon, a publié dans 'L'Écho Musical' de Bruxelles une série d'études très-intéressantes sur le doigté de quelques instruments à vent, dans lesquelles il parle *ex-professo* de la flûte Boehm.

La lecture de ces articles nous a beaucoup intéressé et a réveillé notre attention sur le fameux Schéma que nous avons été chargé d'examiner par le jury de l'Exposition de 1867.

Or, comme nous avons critiqué la base de ce Schéma, dont les longueurs d'onde se trouvaient, suivant nous, trop grandes par rapport à notre diapason normal, nous avons voulu de nouveau vérifier ce diapason, et nous nous sommes rendu compte que l'augmentation d'étendue donnée par Boehm aux ondes sonores qui servent de base à son Schéma avait sa raison d'être.

D'abord, pour nous assurer de la conformité du diapason avec l'exécution de la flûte elle-même, nous avons prié M. De Vroye, l'un de nos meilleurs flûtistes, de nous confier son instrument (une flûte en argent système Boehm). Or, cette flûte présentée sur le Schéma s'est trouvée très-exactement conforme au diapason, tant pour la longueur totale que pour la division des trous latéraux de la 1^{re} octave chromatique.

Nous devons avouer que cette conformité nous a d'abord surpris ; mais avec un peu de réflexion, nous nous

sommes convaincu que cette augmentation d'étendue des ondes sonores de la flûte provenait de l'échauffement de la colonne d'air de l'instrument par le souffle de l'instrumentiste.¹

Il est facile de reconnaître que cet échauffement élève la température de l'air à 26° centigrade en moyenne, ce qui donne à la vitesse du son 346^m60 par seconde au lieu de 340^m, comme on le suppose à la température moyenne ambiante. De cette manière la longueur d'onde du la normal

$$= \frac{346^m60}{870} = 0^m398$$

et celle de l'ut grave

$$= \frac{346^m60}{517\ 30} = 0^m670$$

ce qui est conforme à la base du Schéma ou diapason de Bœhm.

D'après ces nouvelles observations on doit conclure que le Schéma ou diapason de Bœhm a été très-exactement établi, et qu'il répond à tous les besoins de la facture de cet instrument.

Nous devons ajouter ici quelques observations qu'il nous a été donné de faire pour la vérification de la flûte Bœhm que possède M. De Vroye :

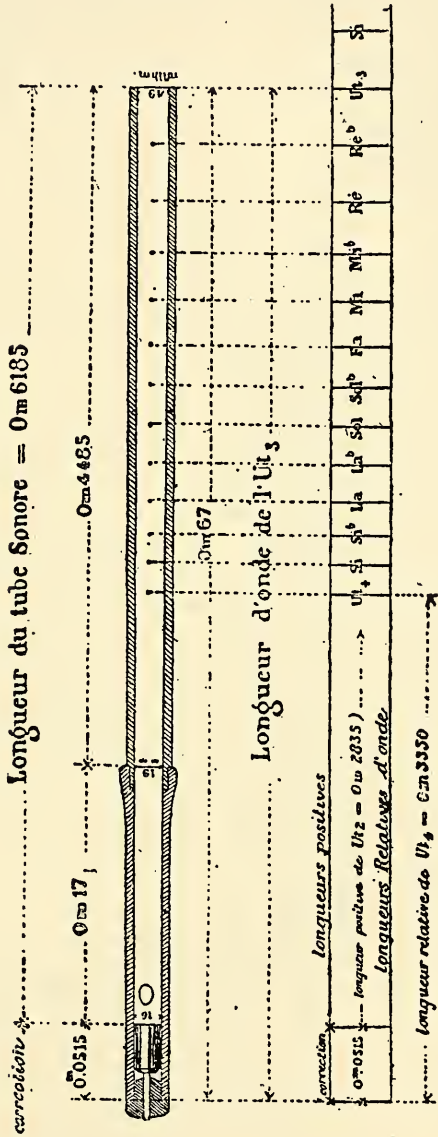
1° La longueur totale extérieure, depuis le joint de la petite calotte mobile de la tête destinée à régler le bouchon, jusqu'à l'extrémité ouverte, est exactement égale à la longueur d'onde de l'ut₃, soit 0^m6700

2° La longueur positive de la colonne d'air, depuis le bouchon jusqu'à l'extrémité ouverte = 0^m6185

3° La réduction de longueur d'onde = 0^m0515

¹ M. De Vroye nous a fait observer, en effet, qu'avant de jouer la flûte métallique on avait soin d'échauffer l'instrument en l'insufflant par son embouchure, après avoir préalablement fermé tous les trous latéraux et aussi extrémité ouverte, en l'appuyant sur le genou. De cette manière, la flûte prend presque aussitôt la température et ne varie plus de ton durant un concert.

La flûte en bois est plus difficile à échauffer que celle en métal. On sait que le métal est meilleur conducteur de la chaleur que le bois, ce qui explique le phénomène.



4° Le diamètre intérieur de la partie cylindrique de la flûte est de 0^m019 , sur une longueur de 0^m4485 .

5° La portion conique du tube où est située l'embouchure, depuis le bouchon au joint de la flûte, est de 0^m17 de longueur.

6° Le diamètre au bouchon est de 0^m016 et au joint de la flûte il est de 0^m019 , conformément à la figure ci-jointe.

NOTE EXPLICATIVE.

1° La ligne C indique graphiquement et en chiffres les longueurs d'onde au ton normal français de 870., à la température de 26° centigrade, laquelle donne à la vitesse du son 346^m60 par seconde.

2° La ligne B, divisée pareillement à la ligne A, porte, inscrites au-dessus de la ligne, les longueurs positives de la colonne d'air de la flûte à partir du bouchon, et la distance de la ligne du bouchon à l'extrémité bouchée de la flûte, soit 0^m0515 . Cette mesure représente la correction des longueurs d'onde pour tous les tons de la gamme chromatique de la flûte. Au-dessous de la même ligne B, on a inscrit les nombres de vibrations par seconde correspondant à chaque intervalle de l'échelle au ton normal et d'après le tempérament égal.² Pour déterminer les longueurs positives du tube sonore, il suffit de retrancher de la longueur d'onde la correction déterminée expérimentalement, qui est ici de 0^m0515 , et la différence donne la vraie longueur du tube sonore. Exemple :—

La longueur de l' ut_3	=	0^m6700
Et la correction étant de		0^m0515
La longueur positive est de		0^m6185
comme l'indique le Schéma.—Pour l' ut_4 la		
longueur d'onde	=	0^m3350
La correction étant de		0^m0515
La longueur positive est de		0^m2835

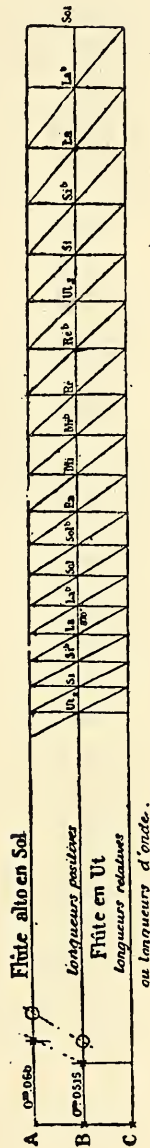
² On trouvera les nombres dans les deux tableaux ci-après.

On trouvera de la même manière tous les autres intervalles de l'échelle chromatique de la flûte en ut.

FLÛTE ALTO EN SOL.

La flûte alto en sol, indiquée sur le même Schéma, présente quelques différences de diapason avec la flûte en ut. Il est probable que la perce de cette flûte, pour laquelle il n'est donné aucune explication sur le Schéma, diffère de celle de la flûte en ut. La correction est plus grande et les longueurs d'onde plus petites. En comparant les longueurs d'onde des deux ut₃ on trouve :

Pour la flûte en ut	0 ^m 6700
Et pour la flûte en sol	0 ^m 6630
Soit une différence en moins	<hr style="width: 100%;"/>
de	0 ^m 0070
Et si l'on compare les longueurs positives du même ut ₃ , on trouve :	
Pour la flûte en ut	0 ^m 61850
Et pour la flûte en sol	0 ^m 59500
Soit une différence en moins	<hr style="width: 100%;"/>
de	0 ^m 02350
Or la correction de la flûte en sol	= 0 ^m 0680
Et celle de la flûte en ut	= 0 ^m 0515
La différence ces deux mesures	= 0 ^m 0165
Si nous ajoutons la différence des longueurs d'onde ci-dessus	<hr style="width: 100%;"/>
de	0 ^m 0070
On trouve un total de	0 ^m 0235



Conforme à la différence des deux longueurs positives des deux tubes indiqués ci-dessus.

Ainsi que nous l'avons dit au commencement de cette note, on ne peut s'expliquer la différence de diapason employé pour ces deux flûtes que par la différence de perce de la flûte alto que nous avons supposée conique et non cylindrique comme la flûte en ut.

Pendant M. De Vroye, à qui nous avons fait part de cette observation, nous a assuré avoir vu et joué la flûte alto de Bœhm, et que cette flûte en sol était cylindrique comme la flûte en ut, mais d'un diamètre un peu plus grand.

Cette circonstance permet bien d'expliquer la différence des corrections et celle des longueurs positives des deux instruments par la différence des diamètres des tubes sonores ; mais on ne voit pas bien pourquoi Bœhm s'est servi pour le diapason de la flûte en ut des longueurs d'onde correspondant à la température de 26° et à la vitesse de $346^{\text{m}}60$ par seconde, tandis que pour la flûte en sol les longueurs d'onde correspondent à 20° et à la vitesse de 343^{m} par seconde, comme nous l'avons indiqué dans le titre des deux tableaux ci-après.

La seule raison que nous puissions donner de ces deux bases, c'est que la flûte en ut étant plus petite s'échauffe facilement à la température de 26° , tandis que la flûte en sol étant plus grande ne s'échauffe qu'à la température de 20° .

Le savant auteur de la flûte Bœhm connaissait trop bien la théorie et la pratique de la facture instrumentale pour que nous puissions supposer la moindre erreur dans ses diapasos.

Nous joignons ci-après deux tableaux des longueurs d'onde et des longueurs positives de la flûte en ut et de la flûte en sol.

Ces deux tableaux peuvent servir à constituer le diapason graphique ou Schéma de Bœhm comme nous l'avons indiqué ci-dessus.

TABLEAU DES LONGUEURS D'ONDE DE LA FLÛTE EN UT SYSTÈME BOEHM, d'après le ton normal français de 870 vibrations à la température de 26 degrés centigrade, ce qui donne à la vitesse du son 346^m60 par seconde.

Dénomination des tons de l'échelle chromatique.	Nombre de Vibrations.	Longueurs Positives.	Longueurs d'ondes.
1. Ut ₃	517,30	0 ^m 618,50	0 ^m 670,00
2. Rép ou Ut [#]	548,06	0 ^m 580,89	0 ^m 632,39
3. Ré	580,65	0 ^m 545,40	0 ^m 596,90
4. Mi ^b ou Ré [#]	615,18	0 ^m 511,90	0 ^m 563,40
5. Mi	651,76	0 ^m 480,27	0 ^m 531,77
6. Fa	690,51	0 ^m 450,43	0 ^m 501,93
7. Sol ^b ou Fa [#]	731,57	0 ^m 422,26	0 ^m 473,76
8. Sol	775,08	0 ^m 395,67	0 ^m 447,17
9. La ^b ou Sol [#]	821,11	0 ^m 370,57	0 ^m 422,07
10. La	8 0,00	0 ^m 346,88	0 ^m 398,38
11. Si ^b ou La [#]	921,73	0 ^m 324,52	0 ^m 376,02
12. Si	976,54	0 ^m 303,41	0 ^m 354,91
13. Ut ₂	1034,60	0 ^m 283,50	0 ^m 335,00

N.B.—Pour déterminer les longueurs positives, on retranche des longueurs d'onde correspondantes, la correction expérimentale qui est ici de. . . 0^m0515.

Le diamètre du trou de l'embouchure = 0^m012.

La distance du bouchon au bord de l'embouchure = 0^m011.

FLÛTE ALTO EN SOL, à la température de 20 degrés centigrade et à la vitesse du son de 343^m par seconde.

Dénomination des tons de l'échelle chromatique.	Nombre de Vibrations.	Longueurs Positives.	Longueurs d'ondes.
1. Sol ₂	387,54	0 ^m 817,00	0 ^m 885,00
2. La ^b ou Sol [#]	410,55	0 ^m 767,32	0 ^m 835,32
3. La	435,00	0 ^m 720,44	0 ^m 788,44
4. Si ^b ou La [#]	460,86	0 ^m 676,19	0 ^m 733,19
5. Si	488,26	0 ^m 634,42	0 ^m 702,42
6. Ut ₃	517,30	0 ^m 595,00	0 ^m 663,00
7. Rép ou Ut [#]	548,06	0 ^m 557,78	0 ^m 625,78
8. Ré	580,65	0 ^m 522,66	0 ^m 590,66
9. Mi ^b ou Ré [#]	615,18	0 ^m 489,51	0 ^m 557,51
10. Mi	651,76	0 ^m 458,22	0 ^m 526,22
11. Fa	690,51	0 ^m 428,68	0 ^m 496,68
12. Sol ^b ou Fa [#]	731,57	0 ^m 400,81	0 ^m 468,81
13. Sol	775,08	0 ^m 374,50	0 ^m 442,50

N.B.—Pour déterminer les longueurs positives, on retranche des longueurs d'onde correspondantes, la correction expérimentale qui est ici de. . . 0^m068.

Le diamètre du trou de l'embouchure = 0^m012.

La distance du bouchon au bord de l'embouchure = 0^m0145.

Pour les autres détails lire attentivement la note qui précède ces tableaux.

LETTERS

ON

THE BOEHM FLUTE.



THE following letters were addressed to the Editor of 'The Musical World' in the year 1843, when the Boehm flute was beginning to oust from popular favour its older rival. They give an insight into the violence of the passions which agitated the flute world on the outbreak of the revolution. Those who peruse them will see an apostle of the new creed, backed by a solitary convert (for when the fight began the rest of the little band, it seems, forsook him and fled), boldly proclaiming their strange doctrines, whilst the votaries of the old faith, wrought to the utmost pitch of exasperation, are gnashing their teeth with fury. They will be treated to the spectacle of Clinton, whose only crime was that he had discarded the old flute for Boehm's, bespattered by "ignorant presumption" with the mud of "low abuse," insulted by having his nationality (he was an Irishman) thrown in his face, and accused of foisting on flute-players as his own, an essay written by another hand. But they will observe that the bystanders speedily grew tired of watching the fray, for it was apparent from the first that the uproar owed its origin to the old, old motive which eighteen hundred years before, had impelled the silversmiths of Ephesus, to shout till they were hoarse, "Great is Diana of the Ephesians!" The scene, however, is not without its lesson. If the disciple was scoffed at, how can we expect that the Master would

escape being reviled? When the essay Clinton had written on the Boehm flute was falsely stated to be a translation of some foreign production, what wonder is it that the instrument itself should have been pronounced, instead of being the work of Boehm, to be nothing but a copy of another man's invention?

The most instructive point, however, in connection with the letters is the light one of them (No. 8) throws on the character of Mr. Cornelius Ward, the gentleman whom we are taught to regard as an "absolutely disinterested witness," and "Boehm's superior in every way, excepting in the matter of musical attainments." He gives us an overwhelming proof of his absolute disinterestedness by rushing into the thick of the fight, and laying about him in all directions with such vigour that neither Clinton, Coche, Card, Boehm, nor Rudall and Rose escape his blows. Having demolished these gentlemen to his satisfaction, he draws himself up to a height of superiority which reaches the sublime. He affects to believe that it was the consciousness of their inferiority to him, jealousy of his inventive powers, and envy of the success of his patent flute that had effected the conversion of Messrs. Rudall and Rose from the old to the new belief; whilst as for Boehm, his triumph over him had already commenced, for no sooner had his own invention made its appearance in the world than some of the most talented English players at once threw aside his rival's pirated instrument to adopt this "original" production. However, his efforts at self-inflation, instead of distending his form to the proportions of that of his gigantic rival, resulted, like the exploit of the frog in the fable, in disastrous humiliation.

The correspondence was occasioned by a notice in the columns of the 'Musical World' of Clinton's 'Theoretical and Practical Essay on the Boehm Flute' as follows:—

“We are not flautists, but we respect new inventions, that is, provided they be good as well as new. Mr. Clinton stands in the foremost rank of modern British theoretical and practical flautists. He is an accomplished player and a good writer for the instrument. Mr. Clinton’s word in flute matters is consequently of high importance, and Mr. Clinton tells us that the ‘Boehm Flute’ is a vast improvement on the ancient flute, and we are bound to believe Mr. Clinton—especially as he is not himself the inventor of the new instrument which he has taken under his protection. The flute was, it appears, full of imperfections, all of which imperfections are remedied by Herr Boehm in this his new invention. We have not space to particularise the defects of the old or the remedies of the new instrument, but our readers will put faith in what we state, viz. that Mr. Clinton’s carefully written and sensible essay has perfectly convinced us of the justice of his cause, and, for the future, quoad the flute, we are decided *Boehmisers*, without quarter.”

No. I.

(From J. Clinton.)

THE BOEHM FLUTE.

14 GREEK STREET, SOHO SQUARE.

DEAR SIR,

My essay on the Boehm flute being intended expressly for the flute-playing community, may possibly have deterred you from entering fully into the details, in the review of it in your last number, but whether we view Boehm’s system as a specimen of considerable ingenuity and mechanical skill, or as an undoubted improvement on the flute, it must, I conceive, be alike interesting to your readers, because his system is totally different from all others, and as the flute has been experimented upon

in various ways by the different manufacturers and professors, each considering that they had approached nearer to perfection, the public may probably only view Boehm's system in much the same light, and I am therefore anxious to undeceive them.

Any person who is acquainted with the divisions of a string, as exhibited on a monochord, must at once clearly perceive that the arrangement of the holes on the old flute is false and unnatural in the extreme, not only as regards distance, but *size*, for these two points equally influence tone and intonation.

I cannot imagine that the makers and performers were ignorant of the prevailing error; indeed, their constant efforts to approach perfection *prove* their knowledge of the then existing faults, which, they were doubtlessly aware, could have been at once rectified by an equal and natural distribution of the holes.

Now, although this would render the instrument perfect in a theoretical point of view, the old system of machinery or keys became quite useless, consequently it was deemed impossible to make the flute practically correct, until Boehm, in his twofold capacity of performer and mechanist, discovered that the fingers could not only be brought to govern the holes when equally formed and distributed, but with even greater facility than before, thereby removing the numerous imperfections of fingering at the same time. By the result of his labours we obtain "perfection of tune, increase of power, superior quality of tone, greater susceptibility of sweetness, equal strength upon the notes, a very considerable increase of facility in producing the sounds, much less extension of the fingers, and perfect control over all the keys." Having myself been fortunate enough to become acquainted with these important advantages, I was naturally anxious to introduce the Boehm flute to the English players, and it affords me no inconsiderable degree of pleasure to find that those who have already obtained

instruments from the manufacturers, Messrs. Rudall and Rose, are as clearly convinced of the truth and efficacy of the system in every point as I led them to expect ; this is further proved by the numerous orders which the makers have already received, although the Boehm flute may at present be considered in its incipient state in this country. My knowledge of mankind induced me to imagine that an invention so true and philosophical was certain to meet with its share of abuse and opposition at first, and I therefore hinted as much in my essay, but I must confess I did not anticipate that I myself should share in the abuse ; however, so it is, for I well know that certain parties lose no opportunity to rail against Boehm's system, and slander me for introducing it, which may possibly deter some amateurs from embracing that which is pure and musician-like.

Mais n'importe, truth may be for a time concealed, but when it does become apparent, as eventually it must, how ridiculous and contemptible those will appear, who now, from ignorance of the system and malicious opposition, endeavour in vain to prevent its general adoption.

Amongst other falsehoods uttered against me, it has been asserted that I am not the author of my essay, but that it is a translation ; may I not reasonably demand the production of the original, and publicly state, that until it be produced, the individual who circulated such a base report, must be contented to bear the epithet given to those with whom a strict adherence to truth is not the most besetting sin. But enough of this, we live in too enlightened an age to have so excellent an invention thrown into oblivion by *mere assertions* ; the advanced state of the arts generally, more particularly music, is quite sufficient to induce all reflecting minds to enquire dispassionately into the merits of Boehm's invention, and to make the enquiry of those who really understand and can practically illustrate it, by which means only they will be enabled to form a just estimate.

Should you deem these observations worthy a place in your journal, which always advocates everything tending to improve or advance the art of music, I shall feel flattered by their insertion.

I have the honour to remain,

Your humble servant,

J. CLINTON,

*Professor of the Flute in the
Royal Academy of Music.*

No. 2.

(*From T. Prowse.*)

THE BOEHM FLUTE.

13 HANWAY STREET,
Nov. 30th, 1843.

SIR,

Judging I might take the liberty of sending you a few lines for the readers of your valuable paper, I have written the following in answer to the *Puff* on a *Boehm Flute*, edited by Mr. J. Clinton; and should you think the following lines suitable for your columns, you will oblige your humble servant by inserting them.

Mr. Clinton, in your last number, gives himself the credit of being the first to introduce the Boehm Flute in this country, and appears willing to forget what has been going on in the musical world for the last few years. Therefore, I feel myself obliged to state to him and friends, however unpleasant it may be, after such an assertion in print, that T. Boehm was the first in this country to introduce his new flute, and not Mr. C., and (his flutes were manufactured by Messrs. Gerock and Wolf about 14 years ago) has Mr. C. forgotten also that Dorus preparing himself to play a solo on the Boehm flute at the Philharmonic in London, did actually play the 'Swiss Boy,' by Boehm; the same piece that Boehm had played years before him? and

when solicited for another solo, the 'Swiss Boy' was again to be the piece ; and because he had no other, they did without his services ? (By the bye, the 'Swiss Boy,' by Boehm, appears to be a favourite subject with this flute.)

M. de Folley seven years back, previous to his visiting England, was requested by "Cochi and Buffett," the original makers of Boehm's flute in Paris, to distribute a pamphlet when in London in reference to the said flute. Mr. C. probably was not aware of this, although a member of the profession, and possibly may thank me for refreshing his memory on this point, "but alas!" Mr. C. might then have been in Ireland, and therefore was not likely to hear any thing about it ; having I think said enough to convince your impartial readers, that Mr. C. was not the first for introducing the new flute as he terms it : allow me to say a word or two in respect to the instrument mentioned by him, and am sorry that Mr. C. has not stated any thing whereby we may be able to judge for ourselves, in fact he has only made assertions without proof, as I am not aware that more than one solo has ever been played on that instrument. I do not think that any one else has done anything to prove its superiority : I must therefore beg Mr. C. in future to ponder well the subject before he sends it to press, because, that is a living testimony against him and which he cannot retract, but however the reader may say I have stated that it was a puff, and therefore I ought to be above noticing it ; in answer, allow me to say that where a professor, whoever he may be, gives his opinion and no more, I should not have noticed it as it is a matter of business, but when he openly states the manufacturers in London (and I suppose he includes myself as one, having been the maker of flutes for the late *C. Nicholson*), knowing the defects that were in the instrument, had tried various ways to rectify the evils, and must ultimately

descend from our high position, and copy that which is known to be a decided failure, "viz. the Boehm Flute," and in contra to the talented Mr. C., my opinion blended with that of *Mr. Saust, M. de Folley*, and Herr Friesch is this, that the instrument is a failure, for the only key the Boehm flute is playable in is C, independently of the change of fingering, and the further you remove from the key of C, the greater the imperfections are, or why is it that the solos played on that instrument are in that and no other key; and are the beautiful gliding passages, which so frequently occur in *Nicholson's music*, and other writers, to be forgotten, as those passages cannot be accomplished on this, owing to the rings used, instead of the more natural way of stopping with the fingers; and allow me further to ask how it is, that with so perfect an instrument as this, for the upper tones to be so weak and thin as they are? I do not allude to any particular maker on the Boehm system, as all the flutes in this respect are alike, whether *French* or *English*.

Is Mr. C. aware that M. de Folley, after giving the instrument a fair trial of six months (and the instrument was made by "Buffett," the maker for Boehm,) gave it up, for he found so many defects in it, that his old instrument was far more perfect.

Has Mr. C. forgotten also the trial that was given both flutes at the Conservatoire in Paris, at which meeting Herr Friesch gained so complete a triumph over the disciples of Boehm, Herr Friesch on his own flute playing the music that Boehm had written for his peculiar instrument, whilst the professors on Boehm's system failed. This meeting consisted of the following gentlemen: 'Dorus,' 'Cochi,' 'Camus,' 'Tulou,' and 'Friesch.' The essay by Mr. C. states, "margin, page 4," the result of a critical examination of the old and new flutes at the Royal Academy of Fine Arts in Paris, and the names mentioned are those of five pianoforte composers—and

what in the name of common sense can they know about the difficulties, or, *vice versa*, of the flute. May I ask, if the piece played was the 'Swiss Boy,' by Boehm, in the key of C.

Hoping the foregoing remarks may not be considered too lengthy for your columns,

I remain,

Your obedient Servant,

T. PROWSE.

No. 3.

(From J. Clinton.)

THE BOEHM FLUTE.

Nov. 6th, 1843.

MY DEAR SIR,

The letter of Mr. Prowse, which appeared in your last number, reluctantly compels me to trouble you with a few lines to vindicate myself from his scurrilous attack, and I trust you will do me the justice to give them publicity. That my adoption of the Boehm flute proceeds entirely from disinterested motives, must be quite evident from the fact, that I am neither the inventor nor maker, nor have I any interest whatever in the manufacture of it. I think your readers will say that Mr. Prowse's position is widely different, for he, as a maker of the old flute, feels Boehm's system as an ugly thorn in his side, and consequently sets all his engines at work to defeat it, although in his letter he unhesitatingly pronounces it to be "a decided failure." Now, if it really be a failure, why does he take such infinite pains to abuse it? The only excuse he offers is, that when I in my letter alluded to the manufacturers, he supposes I included him, and so offers that supposition as a justification of his *personal* attack. Had he been prompted by *pure motives only*, he would have attacked the *system*,

and not the *individual who advocates it*. That his incoherent and vulgar epistle merits silent contempt, I feel aware, but as silence might be construed into assent, I will condescend to reply. In primis—Mr. Prowse takes infinite pains to prove that I was not the first to introduce Boehm's system to the English flute players, because (as he states) it was manufactured fourteen years ago, and played upon by the inventor and M. Dorus. Now to make use of Mr. Prowse's words, "*however unpleasant it may be to himself and his friends,*" I must in justice to myself state, that the flute for which I have written my essay, and which is manufactured by Messrs. Rudall and Rose, is on a *different principle* from that originally played upon by Herr Boehm, the inventor, therefore Mr. Prowse's first statement is not in strict accordance with truth—but if we were even to *suppose* that my essay had been written for the instrument of which he is *dreaming*, he ought to know that the mere act of making and playing upon an instrument do not constitute the *essentials* to render it general: its nature and properties must be *explained*, and *instructions given for its acquirement*, ere the professor or amateur can render it available.

Now, as chance has made me the first to accomplish this, I think I may be fairly considered as the first to introduce it *effectually*; at the same time, I wish it to be clearly understood, that I claim no *credit* whatsoever, neither can I see any credit to be claimed in forsaking a false and imperfect instrument for one that is proved to be true and perfect.

He next claims my thanks for refreshing my memory as to the existence of a certain pamphlet, and in the same moment states that, being in Ireland, I might not probably be aware of the existence of that pamphlet. Here is a *bull* with a vengeance—"Refresh a man's memory with a subject he never heard of;" alas, Mr. Prowse, if you could but make flutes as perfectly as you

can make *bulls*, there would be no occasion for Boehm's system; and to make his letter even more ridiculous, he gives a mutilated quotation from my essay, which quotation happens to be taken from that very pamphlet, and runs (*in my essay*) thus:—"As the French say, there are not two notes on the old flute which appear to belong to the same family. *Vide* the report made from the result of a critical examination of the old and new flutes, at the Royal Academy of Fine Arts in Paris, by Messieurs Cherubini, Paer, Auber, Halévy, Carafa, &c., &c." Now, sir, let us see Mr. Prowse's version, which he gives thus:—"The essay by Mr. C. states, 'margin, page 4,' the result of a critical examination of the old and new flutes, at the Royal Academy of Fine Arts in Paris, and the names mentioned are those of five *piano-forte composers*—and what in the name of common sense can they know about the difficulties, or *vice versa*, of the flute."

So you perceive, Mr. Editor, that Mr. Prowse finds it convenient to leave out the sense and pith of the quotation, and to make mere *pianoforte composers* of five of the greatest musicians in Europe, and likewise to attach no importance to their opinions, by a weak effort in confounding tone and intonation with the difficulties of fingering, although fingering is not mentioned in that part of my essay.

It is well known to all sensible men, that the difficulty of *fingering* an instrument cannot in the abstract affect the tone or tune; but that part of my essay which treats of the fingering, fully proves that the *old* flute is infinitely more perplexing and difficult than the new, so that Mr. Prowse's attempt at mutilation completely upsets his own argument. He appears to dwell very much upon the idea that the Boehm flute can only be played in the key of C, because Dorus played Boehm's variations to the 'Swiss Boy' in that key, and (*as he asserts*) could play no other piece, although it is a well known fact,

that Dorus has been one of the greatest favourites in Paris as a solo performer for many years. But Mr. Prowse is not over nice in his *ignorant*, although it may be to his interest to throw it into oblivion. Having already, I fear, intruded too much upon your journal, I will merely add, that if the Boehm flute were never heard, I should be nothing the poorer, and if the manufacturers, Messrs. Rudall and Rose, sell 100 per diem, I shall be nothing the richer ; *ergo* I have done,—

And have the honour to remain,

My dear Mr. Editor, truly your's,

JOHN CLINTON,

*Professor of the Flute in the
Royal Academy of Music.*

No. 4.

(*From Flauto.*)

THE BORE'EM FLUTE.

BIRMINGHAM, *Nov. 6th, 1843.*

SIR,

A vast deal has been written, said, and sung lately, respecting a flute denominated the *Boehm*, which, in my simplicity, I put down as so many *puffs* to *blow* the said flute into favour ; for all that have written on the subject are more or less interested in the affair. I should like very much to hear the impartial and unbiassed opinion of a competent judge of the instrument, giving, at the same time, a sketch of the improvements (?) said to be made on it, so that we amateurs might have our understandings enlightened on the subject ; for, as the matter stands at present, it is all a mist and mystery. I have been a performer on the flute through all its changes, from the simple one-keyed instrument of Hale, to Potter's six keys and Manzoni's eight and ten, and have found them

all, in some notes, imperfect in intonation ; but, being aware of the defects, I have contrived to play tolerably well in tune. Do the eulogisers of the Boehm flute undertake to say that every note producible on it is *perfect*, without having recourse to cross-fingering, and without adding to its complexity ? If they will guarantee all this, I may, perhaps, put aside my auld acquaintances and take to the new ; but if this cannot be proved to my entire satisfaction, I shall be content ; and I trust that your readers generally will petition your correspondents not to *Bore'em* any more with a subject in which very few indeed take the remotest interest.

Yours, &c., &c.,

FLAUTO.

No. 5.

(*From Old Howling Stick.*)

ON FLUTES.

SIR,

Permit an old amateur flutist to have a say respecting the flautomania attempted to be introduced for French flutes. I wish to caution my brother amateurs to pause before they purchase. I complain of these professors and flute makers telling us amateurs that all our old flutes are good for nothing ; *they* have just discovered this, and wonder at our ignorance so long on the subject. I have bought various expensive instruments of one of our best makers, and always had them *warranted perfect* ; as they have all along been working in the dark, they ought, now they have got illuminated on the mystery of flute perfecting, to return me my money, and take back my old flutes : but no, they say old ones are of no use *now* to them ; buy a Boehm, price only sixteen (or more) guineas, and then how the tone will come out !! I, as an Englishman, think in our own home-made flutes, since Nicholson's time, a *national* instrument, we have

equalled, and perhaps *excelled*, all foreigners on this instrument; we have men who can yet play a little on the wretched old flute I calculate, therefore, my brother amateurs, hold hard a while until these new lights shine better in their playing and extinguish our old ones, or till our orchestra players adopt them. Nicholson has written, "it is not in the size or make of the finger holes that playing in tune and good tone depends, but in the management of the mouth hole or embouchure; a good player can make a note a quarter of a tone sharper or flatter, weaker or stronger, at pleasure; it is not the flute that is at fault, but the man who sits behind it;" in conclusion, I again warn my brother amateurs against hastily changing their flutes as many I know have done, and eventually could not play upon either, between the two stools, or *tools*, they have got *floored*.

Yours, &c.,

OLD HOWLING STICK.

No. 6.

(From Omega.)

DEAR WORLD,

Your last number contains a letter, headed "On Flutes," in which your *clever* correspondent, "Old Howling Stick," asserts that a good player can make a note *a quarter of a tone weaker or stronger*, at pleasure. Perhaps he, or you, will have the kindness to enlighten your readers as to the meaning of this novel musical phenomenon; it reminds me of the clever sportsman who said he could "shoot round a corner."

Make a note a quarter of a tone weaker! or stronger!!
Bravo, Old Howling Stick! Bravissimo!!!

Yours, &c.,

OMEGA.

No. 7.

(From Thomas Prowse.)

ON THE (NON) BOEHM FLUTE.

13 HANWAY STREET,
Nov. 21st, 1843.

MR. EDITOR,

Allow me to notice one observation which Mr. Clinton mentioned in his last letter in the 'Musical World'—“He” (meaning myself) “should not forget that he has lately advertised to bring out *a new flute of his own*, stating his intention of doing so to me and others.” Does not this fact prove that I do not (using his own expressions) “vainly attempt to hoodwink the public as to the merits of the Boehm flute?” for being much on the principle of Mr. Clinton's (different principle) Boehm flute I was not anxious to push my unsuccessful attempt before the public, and I do not consider that my reputation is lessened by endeavouring to improve on another more complicated system than the one so much approved of, and recommended by the late Charles Nicholson, and which I find by experience has not up to this time been excelled by any other invention, nor do I believe that the public will think worse of me for withholding my suggestion. If this be not a satisfactory reply to Mr. Clinton's letter, I will trouble you (with your permission Mr. Editor) with a more minute investigation of the (non) Boehm flute next week.

And remain, Your obliged Servant,

THOMAS PROWSE.

No. 8.

(From Cornelius Ward.)

THE BOEHM FLUTE.

36 GREAT TITCHFIELD STREET,

Nov. 7th, 1843.

SIR,

I have observed in the two last numbers of the 'Musical World,' some letters, containing statements and remarks upon an instrument styled the "Boehm Flute," which are calculated to mislead the public. I therefore need no other apology for soliciting you to allow me to state a few facts relative to the subject, in your journal.

From the tone and strain of Mr. Clinton's letter, one would suppose that he is not aware of the transactions that have taken place in this country, relative to the flute in question, otherwise I cannot account for his pretensions to so much credit regarding its introduction to "English players." It appears that Mr. Clinton would wish to convey the impression that he was the first to make the attempt. I should be sorry to state that he is desirous of concealing, or suppressing, a knowledge of the efforts of other professors, and English professors too, in the same way, for years past. I would rather suppose that he does not know that in the year 1831 Messrs. Gerock and Wolf manufactured a flute, purporting to be the invention of Boehm, and that Mr. Wolf displayed considerable talent in his performance upon it. They, at the time, published a "Scale and description of Boehm's newly invented patent flute, manufactured and sold by the patentees only" (I cannot say that they had a patent for the same), a copy of which now lies before me. It contains a sketch of the flute, which shows it

to be a different one to that since put forth as Boehm's. It was not successful with "English players," and was very incomplete as to its pretensions; Mr. Card's improvement is a part of it.

About the same time when Mr. Wolf was endeavouring to introduce the Boehm to "English players," I made a flute for, and under the direction of Captain Gordon, of Charles the Xth's Swiss Guards, which, I believe, will prove to be the origin of that which is now called the Boehm flute. I could give many particulars in support of this belief. The captain tried to introduce it to "English players," without success. He afterwards went to Paris, and at *Munich*, at which places also, the captain endeavoured to introduce it.

In 1835, I heard Boehm perform his fantasia, 'The Green Hills of Tyrol,' at the Choral Fund Concert, upon a flute very similar in principle to that which I made for Captain Gordon. Boehm was very zealous, but failed in introducing it to "English players." Shortly after this, Camus commenced practising it in Paris, and Godfrey to make it. Dorus then took it up, and added an improvement; Coche also modified it, or as he modestly says, perfected it, and employed Buffet to make it.

In 1839, I began to make what is termed the Boehm flute in London, as improved by Dorus, and Signor Folz performed upon one made by me, at many concerts in England, in the course of that year. Mr. Card, too, persevered for some time to introduce it to "English players," but without any good results, and besides, we had Camus and Dorus endeavouring to introduce it to "English players," by both public and private performances.

Now, we may with reason ask what Mr. Clinton's present connection were doing all this time? Why, they did all they could to obstruct its being adopted in this country, and very shortly before they were *fortunate enough to become acquainted with its advantages*, they

succeeded in persuading several *not* to adopt it who were anxious so to do, and some of whom were respectable professors.

I fear trespassing too much upon your time and columns, otherwise I would state facts further to prove that Gordon laboured in the invention; that Boehm was the first who endeavoured to introduce the instrument to the professors and players of England, France, and Germany; and that Mr. Clinton's present friends were strongly opposed to it until very lately.

Some may be puzzled as to the means by which Mr. Clinton and his present coadjutors were so very suddenly converted into "Boehmites"; they were these: I lately constructed an original flute, for which I obtained a patent, and which was immediately adopted by some of the most talented "English players," directly displacing the Boehm in several instances, as well as the ordinary flute; and after Mr. Clinton and his present friends heard its effects and witnessed its success, they then bestirred themselves to produce something new, but not succeeding in the field of discovery, they ultimately took to the object of their former dislike—the "Boehm," the simple "Boehm"—that is, the one that could be made with the least expense, *minus* the French additions and finish, which make it more complete and elegant as an instrument.

I have endeavoured to be brief, but am apprehensive of being considered tedious, though I must beg to assert my claim to the merit of having converted Mr. Clinton and others named in this letter to the feelings which they now choose to manifest towards the Boehm flute.

I am, Sir,

Your obliged Servant,

CORNELIUS WARD.

No. 9.

(From W. C. Hodgkinson.)

A WORD OR TWO ON THE BOEHM FLUTE.

42 HART STREET, BLOOMSBURY SQUARE,

Oct. 31st, 1843.

SIR,

As public attention has been called to the flute invented by T. Boehm, I am induced, for the sake of the amateurs practising this delightful instrument, to make known the following particulars. T. Boehm's flute first appeared about fourteen years ago at Covent Garden Theatre, on which the inventor played his variations on the 'Swiss Boy.' Messrs. Gerock & Wolfe, Cornhill, manufactured the flutes, but were not successful in persuading the public to change the flutes manufactured by Clementi of Cheapside, called "C. Nicholson's improved." The Boehm flute since that period has not been heard of. Mr. Nicholson, at the time it first appeared, did not speak of it as deserving any particular attention more than any other German flute, which is known to almost every amateur to be in its tone extremely thin and out of tune, the only difference being that the system of fingering was entirely changed and complicated, and did not possess the qualities of the English manufactured flutes. Amateurs will, I trust, be convinced by the following facts, that neither in England, France, nor Germany is the Boehm flute patronised. In Germany, the celebrated Herr Frisch, whose performances for execution when in London astonished the professors and amateurs, does not play upon the Boehm flute, nor does his gifted countryman Saust, nor do the celebrated Drouet and Tulou, flautists to the King of France, play upon the Boehm flute. In England, neither does Ribas nor de Folly, flautists

at the Italian Opera House, play upon the Boehm flute. These facts do not speak much in favour of the flute that is said to surpass all others. The public are informed that half-a-dozen French composers (not flute players) have given their opinion in favour of it, but it is not said who performed upon it in order to obtain their opinion—certainly not their *first* flautists. I cannot, therefore, place much faith on their judgment, except when they say “on *their* old flutes there are not two notes which appear to belong to the same family.” I agree with them, for French and German flutes are the most imperfect instruments manufactured. The celebrated Nicholson and his father did more for the flute playing community than all the professors in Europe. What professor can say there were not two notes belonging to the same family when Nicholson played? Mr. James, in his word or two on the flute, thus speaks of him:—“The tone which Mr. Nicholson produces on the flute is, perhaps, the most extraordinary thing that he does. It is not only clear, metallic, and brilliant, but it possesses a volume that is almost incredible; and this, too, be it observed, in the very lowest notes of the instrument. The similarity between his tone and that of an organ is very striking, and the amazing command which this of itself gives over his instrument is astonishing. He is also, perhaps, better acquainted with the delicacies of the instrument than any other performer; his shakes are in general regular, brilliant, and effective, and possess the rare quality (which is not the least of their beauties) of being *perfectly in tune*, also the effect of his chromatic ascension of the scale. It is a complete rush, like the torrent of a waterfall,¹ and, to the ear, is almost overwhelming

¹ Torrents which rush downwards are common enough, but water falling upwards is a phenomenon which would astonish the shade of Newton. Possibly, however, Mr. James was an Irishman. Nicholson in his *School for the Flute*, compares the effect of a well-executed ascending chromatic scale to the rush of a skyrocket.

and irresistible. His adagios are full of fervour and feeling, for the truest test of a performer's talent is in a slow movement." After such facts, I need scarcely say that no amateur will adopt a Boehm flute; for who has not heard the exquisite performances of Mr. Richardson on a Nicholson flute? Can any impartial person speak one word disparagingly of his tone or execution, or will he venture to say there are not two of his notes which appear to belong to the same family? the idea is preposterous. I shall dismiss the subject, relying on your kindness to give insertion to this letter, in the hope that amateurs will long continue to appreciate the beauties of the celebrated C. Nicholson's flute, which is, and has always been, the admiration of all the first-rate flautists.

I have the honour to be, Sir,

Your very obedient Servant,

W. C. HODGKINSON,

Professor of the Flute.

No. 10.

(From John Pask.)

THE BOEHM FLUTE.

LOWTHER ARCADE, STRAND.

DEAR SIR,

My attention having been drawn to a letter which appeared in the columns of your valuable journal, written upon the subject of the Boehm flute, and so highly eulogistic of its merits and great superiority over all others, and the fact of that letter being addressed principally to amateurs, to induce them to lay aside the flutes now in use, and adopt those manufactured by Messrs. Rudall and Rose upon the above named principle, I feel myself called upon in justice to them to

make a few brief remarks, the result of my own experience, and drawn from the evidence of those who have given that particular instrument a trial.

It is not my intention to occupy your valuable time and space in contending for the identical person who introduced this great boon to the flute players of this country. It is true Mr. C. has awarded to himself all the merit due to such an individual, but enough has been said on this head in a letter written by Mr. Prowse which appeared in your journal of November the 2nd, and ought to be read by all interested in this subject, being full of incontrovertible facts, supported by the testimony of those who I am sure Mr. C. will admit to be capable of forming an opinion.

The genuine Boehm flute, made by Buffet in Paris, and which was the property of that celebrated player Herr Frisch, and one of the best that has been made upon that principle, was laid aside by that gentleman, and placed in my hands for sale. Of course in my business as a maker I had frequent opportunities of showing the same to several distinguished flutists, and eliciting from them their impartial opinions, which were to this effect—that the Boehm system was perplexing in the extreme, especially to those accustomed to the established method, and if those difficulties could be surmounted the performer would soon be convinced that he had only made himself master of a more defective instrument. The following will in some degree illustrate this:—The flute alluded to was placed in my window for sale, and soon attracted a goodly number of flute players to inspect and try it, but notwithstanding its saleable advantages in having belonged to so great a player, together with the reduced price it was to be sold at, still it was nearly eight months before a purchaser presented himself. This gentleman having heard of its (pretended) superiority over those in use by him, felt anxious to give it a trial; mark the sequel: about six

months after the purchase the same gentleman waited upon me again, and was anxious for me to take it back to find him a customer, for he could make nothing of it. I did not agree to this, and heard nothing more of this said Boehm flute for at least a year, when I was again solicited to try and dispose of it by another person. It was again placed in my window, but I could not succeed, and ultimately returned it to the owner.

Another instance came under my notice ; a gentleman brought me a Boehm flute to repair, I did what was required, and concluded from the way in which he handled it, he must have had considerable experience upon it. I solicited his opinion, when he was candid enough to tell me that he had been originally instructed upon and played for some years on the flute now in use, but having met with a disciple of the Boehm system when in Paris, he was prevailed upon to give it a trial, which he said he exceedingly regretted, for after having devoted an immense deal of time to its study, under the tuition of Cochi (when in that city), he then discovered it to be much more imperfect than the old system, and he would cheerfully retrace his steps to the old method, but for fear of mixing up the now confirmed habits of the new system with that of the original, and so depriving himself of the pleasure of using either effectively.

Mr. C. among the many qualities he attaches to the Boehm flute, states, that perfection of tune is attained. How can this possibly be, when the same fingering must be used for the sharps as well as the flats? The effect such an instrument (with this imperfection) would produce, when played with stringed instruments, can easily be conceived. This defect alone shows the great superiority of the flute now in use over that upon the Boehm principle, as in the former it can be remedied while in the latter it must remain ; the beautiful effect produced by gliding must be excluded, and the facility

of fingering attainable on our flutes, must of necessity be obstructed by the introduction of the rings round the holes.

This latter fact was apparent to many who were present at Mr. Carte's concert, and has been noticed in a report of the same by one of the musical periodicals ; but the giant evil of all is that which has, I think, been satisfactorily proved by several of our greatest artists whose names have appeared upon this subject—I allude to its incapacity of being used effectually in any other keys than those of C, G, or F—thus excluding the beautiful keys of three or four flats, in the use of which our own flutes stand so pre-eminent, and in which most of our best compositions for the flute are written.

There are other minor objections I might mention to show the futility of expecting that the Boehm flute can ever come into general use ; but I fear, Sir, I have trespassed too much upon your time already, my object being simply thus to place before flute players a few important facts which have come under my immediate notice, together with my own practical knowledge as a maker, and supported by the living testimony of some of the most talented flutists of the present day ; for I unhesitatingly admit, that if no other test was given than the extravagant praises which Mr. C. in his letter has lavished on the Boehm flute, it would be sufficient to create dissatisfaction among the performers on the instrument now in use, and probably lead them to abandon a beautiful and comparatively simple instrument for one whose chief recommendation is that of novelty.

I would here remark what I wish to be thoroughly understood, that in detailing the above incidents to show the defects of the Boehm flute, I am actuated by no motives of prejudice against the instrument or its patrons, for I should hail with delight any invention calculated to simplify the difficulties, and remove the

defects of that (now reviled) instrument, which, notwithstanding, in the hands of Drouet, Nicholson, Richardson, Frisch, and others, has made such a lasting impression, as, I fear, the performers on the Boehm flute will find it difficult to efface.

Dear Sir,—If you do not think the above remarks too lengthy and unimportant for the columns of your journal, I shall esteem your inserting them a great favour ; and permit me to subscribe myself

Your very obliged Servant,

JOHN PASK.

No. 11.

(*From Old Howling Stick.*)

SIR,

If your *learned* correspondent "Omega" will put on his spectacles and mind his *stops*, by again reading my former paragraph, he will find it thus—"A good player can make a note a quarter of a tone sharper or flatter ; *weaker* or *stronger*, at pleasure ;" then if Omega can blow a flute *in tune*, let him select any note on the treble clef, say G (as it stands for *Goose*, or rather *Geese*, ourselves to wit) and finger it in the usual manner, blowing very *piano* and increasing it to very *forte* ; he will thus find, that by means of the embouchure *alone*, he has *hit* the method (without *shooting round a corner* for it) of "making a note *weaker* or *stronger*, at pleasure" without blowing it *out of tune*.

Your obedient Servant,

OLD HOWLING STICK.

NO. 12.

(From Embouchure.)

THE BOEHM FLUTE.

I pray you, Sir, to put a mute
 On all this noise 'bout Boehm's flute,
 Your powers arouse
 To muffle *Prowse*,
 Nor let old *Card*
 Contend with *Ward*,
 But quash at once the dull dispute.

EMBOUCHURE.

(We would gladly oblige our jingling correspondent, only that we wish to adhere to our motto, which is *Audi alteram partem*.—ED. M. W.)

NO. 13.

(From Henry Kelsall, M.D.)

THE BOEHM FLUTE.

9 UNION TERRACE, PLYMOUTH, DEVON.

SIR,

Having observed that contradictory opinions on the merits of the Boehm flute have lately been expressed, I was anxious to ascertain the true state of the case, previous to providing myself with so expensive a plaything; and being in town for a few days, I made some enquiry of Mr. Pask, in the Lowther Arcade, on the subject, and came away, with certainly a degree of prejudice against the Boehm flute, having understood from Mr. Pask that the instrument is imperfect, except in the key of C, and that the tones of the upper octave are thin and weak. I have just had a Boehm flute placed in my hands, and can only say I am quite

astonished how anything derogatory to it could have been promulgated—the tones of the instrument I examined are perfect, brilliant and powerful in every key, to an extent I was quite unprepared to expect. I would therefore recommend every amateur, to do as I have (examine the flute himself) and I will venture to say he will come to my conclusion, viz. that the Boehm flute is as superior to the old eight-keyed instrument, as the latter is to the one-keyed flute.

I am, sir,

Your's &c.,

HENRY KELSALL, M.D.

(Puff! Puff!! Puff!!!—ED. M. W.)

NO. 14.

(*From Auletes.*)

LONDON, *Nov. 27th*, 1843.

SIR,

The flute controversy which has for some weeks been carried on in your columns, has set me about instituting some calculations as to the relative merits of the principal instruments which have attracted any attention within the present century. I cannot here give either the grounds on which my conclusions are drawn, or the details of the calculation; but, am prepared to substantiate the general correctness of my position, which are these, viz.—

That, supposing 100 to represent perfection, the best ordinary flutes—I will not say whom I consider the best maker, because I differ from current opinion—but the best, I quote at	25
The English Imitation Boehm at	51
The Genuine Boehm, Paris make, at	64
The New Ward's Patent Flute at	95

If any say my opinion, as an anonymous writer, is worthless, I will wager with him one hundred guineas, that, in a jury of 24 honourable flute professors, 12 chosen by each side, I will have a majority of votes for English Imitation Boehm, over ordinary flutes, or for genuine Paris, over Imitation English Boehm, or for Ward's patent over Paris Boehm.

If any one accepts the above challenge in your columns, you shall have my deposit and name at once. Till when,

I am,

Your constant reader,

AULETES.

(Puff! Puff!! Puff!!!—ED. M. W.)

No. 15.

(From *Jim Crow*.)

THE BOEHM FLUTE.

MY DEAR SIR,

The letter of Mr. Clinton, which appeared in your last number but one, compels me to answer him concerning this new Boehm flute.

When Mr. Clinton can prove that the Boehm flute is far superior to a Nicholson's flute I will then give up my flute and purchase a Boehm, but while the new flute has got so *many imperfections* there is no *chance* of its ever *knocking* a *Nicholson* flute into *eternity*. Mr. Clinton, does not Old Howling Stick say, "It is not in the size or make of the finger holes that playing in tune and good tone depends, but in the management of the mouth hole or embouchure. A good player can make a note a quarter of a tone sharper or flatter, weaker or stronger, at pleasure; it is not the flute that is at fault, but the man who sits behind it." Is not this true —? And

now, Mr. Clinton, I do not doubt but I am *quite right*, and you are *quite wrong*, so the public will perceive how much confidence can be placed in *you*. Most unfortunately for your silly and childish assertions, one of the principal beauties of the Nicholson flute is that it can be *played perfectly in every key*, that of course renders it infinitely *superior* to the *Boehm flute*, which I know by experience, having practised upon the Boehm flute for more than twelve months, and I now condemn the Boehm flute for its imperfections. Mr. Prowse, I have heard, is about to bring out a new fantasia by M. de Folly, *which I know they cannot play upon their Boehm flute*, and which I KNOW CAN be PLAYED upon a NICHOLSON, because I have heard De Folly play it upon a *Nicholson flute* twice or thrice (so much for the Boehm system). And now, my brother amateurs, if you wish to become possessed of a superior flute, I advise you as a friend to go direct to Nicholson's Flute Manufactory, Hanway-street, and order one with the latest improvements, and I'll warrant he does not take you in ; but I should be rather cautious in introducing you to Rudall's party ; and, to prove that my words are true, how is it that Richardson, Saynor, Downes, Royal, Hodgkinson, Tull, Dipple, Minasi, and a great many more *play upon Nicholson's flute* ? Is it because *Boehm's flute* is superior, or is it *vice versa* ? Answer me this, Mr. Clinton, and I will thank you for your trouble by answering *your next saucy* letter.

Yours, &c. &c.,

JIM CROW, London.

[The intemperate tone of this letter would have been a sufficient reason for our declining to insert it had we not felt assured that our talented correspondent Mr. Clinton, who has the manliness to place his name at the end of his letters, could only be benefited by the fact of his arguments, being unanswerable except by low abuse

and ignorant presumption. We have omitted some paragraphs in the letter too gross and personal to suit our paper.—ED. M. W.]

(Puff! Puff!! Puff!!! again.)

No. 16.

(From E. N. F.)

THE BOEHMITES—THE NON-BOEHMITES.

Dec. 11th, 1843,

SIR,

If those quarrelous flautists and others, the flute makers and re-tail-ers, *will* dispute about *old* things being called *new*, or, contrariwise, *new* things being but *old* inventions, *let them*, and they can amuse themselves with such like absurdities; but, for Heaven's sake, do not continue to inflict on your subscribers a series of such useless letters in the pages of your journal, and about what? A Boehm flute! With how much valuable matter could you not have filled the columns of *The World*, that have been so long *thrown away*, or, perhaps speaking more correctly, invaded by this *Boehm* correspondence!

See, Mr. Editor, we have an essay from the pen of Mr. Clinton, but not content, he tortures *The Musical World* readers with a very *heavy* epistle, to which Mr. Prowse vouchsafes a reply, remarkable for being extremely *Pro-se*; and then, again, Mr Clinton comes down with a *Clint-er*. Thus ends the dispute *P. versus C.*; but where meddlers dwell is there any peace? "Old Howling Stick"—what a champion!—steps forward to make his bow, and makes his exit; but that portentous "Omega" must needs draw him from his retirement, and again "Old Howling Stick." "Everything begets his like," says one proverb, and another, that "One fool

makes many." Even so, one scribbler induces a dozen more or less able ; and Mr. Pask, because he must play a part, runs into the arena of discussion to exhibit his ableness in "Much ado about Nothing," and, be it said, he is as successful as his predecessors.

So much for the "Boehms,"—so much for the "Non-Boehms." Mr. Editor, give each an opiate that they may rest from their disputes, and be at peace.—I am your obedient servant, E. N. F.

[We hope the Boehmites will profit by this truly humorous epistle.—ED. M. W.]

NO. 17.

(From "Obadiah.")

THE BOEHM FLUTE.

ASPEN COTTAGE, 18th of the 12th Month, 1843.

FRIEND WORLD,

It grieveth my spirit, to behold so much of thy valuable hebdomadal publication, taken up by *puffs*, *breezes*, and *squalls*, relative to a piece of perforated wood, called by the profane, a Flute, yea, a *Boehm* flute. I will give thee a piece of advice—nay, gratuitously will I give it unto thee, in a couple of lines, *videlicet*—

If its puffers have any more to *say* for it,
I recommend thee to make them all *pay* for it.

Thine, OBADIAH.

P.S. My spouse Rebecca, begs thy acceptance of a piece of plum-pudding, of her own amalgamating.

[The donation is received with infinite relish.—ED. M. W.]

NO. 18.

(From "Anti-Monotonous.")

THE BOEHM FLUTE.

BALDERTON, NEAR NEWARK,

Dec. 4th.

MR. EDITOR,

I am rather surprised that you should allow so much space of your valuable work to be occupied with a discussion on the "Boehm Flute," which seems to be interminable, and can lead to no good. Your correspondents should remember that not 1-20th of your subscribers are flute players, consequently, such matter to them is quite uninteresting; the piano-forte players might with as much propriety, spin a yarn every week respecting the superiority of the tone of a particular maker of the piano-forte, over that of another. Excuse this scrawl.

In haste, yours,

ANTI-MONOTONOUS.

NO. 19.

(From a Professor of Counterpoint.)

(It should be mentioned, in order to make this letter intelligible, that the Boehm flute was not the only subject of personal rather than general interest, on which a correspondence had been carried on in the columns of 'The Musical World.')

MR. EDITOR,

Much as I have felt pleased with some of the recent articles in your admirably conducted work, I think you have allowed full scope to everything that can be said

about the "Boehm Flute," as well as the Antiquarian and Contrapuntists Societies ; and if I am not mistaken, some of your correspondents upon these subjects have been making use of the 'Musical World' for the purpose of letting the public know that there are such persons in existence, by a very "antiquarian" manœuvre, somewhat detrimental to the interests of *Somerset House*, and equally trying to the patience of your readers.

For my own part, at least, what with *antiquarian* doctors, *Italian* professors, the *French Flowers* of metaphor, used by certain *bachelors* (to say nothing of the cabals about dissenting *chapels*), I have had (and so I think your subscribers generally will say) quite *verbum sat*. So roughly handled as the "essay" on the Boehm flute was on the first "review (?)" of it, I am astounded that the monotonous *tootle tootle* in your columns upon that instrument should have been tolerated so long. Many of the performers (?), I doubt not, would have found themselves more in *type* at a *lathe* or *bow-string*, than in endeavouring to make *fools* of composers, and wasting the midnight oil of laborious editors in framing their lucubrations into comprehensible phraseology ; and as to the—the—country punsters (pshaw! you know what I mean, although I can't write or pronounce the word,—conter—pun—pun—contrapuntists—aye, that's it), I thought these learned "pundits" would never have brought their perscrutations to a point or finale. Do, Mr. Editor, have a little mercy upon us *pour l'avenir*, and if in noting your papers, you find any more contributions from these advertising scribblers just pop them into the fire ; assuring them in your "notice to correspondents," that "Timothy Trueism and Peter Prosey's letters are advertisements."

In tendering advice to these erudite gentlemen who have made their debut for the first and (I hope), last time, I am powerfully reminded by the soporific effect

produced by these *Bohemian* and other correspondents, of the lines somewhat paraphrased in the opera of Rob Roy.

Before the first remembrance dies,
Lo "Nicholson" and "Prowse" arise,
Whose place then "Hodgkinson" supplies,
 With bome! bome! bome!
"Hark, hark, from some one member's nose,
A cadence deep—a dying close,"
At which the Contrapuntists rose,
 For home! home! home!

A PROFESSOR OF COUNTERPOINT.

MEMOIR OF DR. SCHAFHÄUTL.



IN an age like the present when signs of a decline of industry, the sure forerunner of national decay, meet the eye on every side, to trace the career of an orphan, who by untiring assiduity won for himself a front place in the race of life, is a task at once agreeable and instructive.

Carl Emil von Schafhäutl was the son of a Bavarian army surgeon.¹ He was born at Ingolstadt on the 16th of February, 1803. Early in youth he had the misfortune to lose both his parents. His education was commenced in the elementary school of his native town, and was continued at the Priests' Seminarv and Grammar School (Gymnasium) at Neuburg on the Danube. Schafhäutl was endowed by nature with a passionate love of music; throughout his long life music, as he tells us in his biography of Boehm, though he could only regard it as a side issue, filled his whole heart. At Neuburg he was so fortunate as to receive instruction in the art to which he was so ardently attached, as music formed part of the curriculum of the school. He was taught the pianoforte and singing; he also learnt orchestral playing, for in the Roman Catholic institutions of Germany the pupils formed a band of their own which played in church on solemn occasions.²

¹ For the materials of this biographical sketch the author is chiefly indebted to a comprehensive account of Schafhäutl's life and work by Herr Ludwig Boehm, which appeared in the *Bayer Industrie- und Gewerbeblatt*, No. 17, 1890. ² *Infra*, p. 395.



Prof. Dr. von Schafranck
kgl. akademischer Conservator
und kaiserl. Rath

On leaving school Schafhäutl returned to Ingolstadt where he joined a member of his father's profession, an apothecary. With him he learnt pharmacy, and what he valued more highly, practical chemistry. His leisure he employed in practising the violin and the double bass, in playing on the organs in the different churches, in studying German literature, and in writing verses, essays and stories for the Ingolstadt weekly paper. One of his early literary productions, a tale for children entitled 'The Old Man of the Mountains,' which appeared in 1819, is still to be found in booksellers' shops.

We next hear of Schafhäutl as a student at the University of Landshut devoting himself to mathematics and natural science. From Landshut he returned to Ingolstadt, and occupied himself with experiments. The following incident shows the determination with which he met the obstacles which beset his path. The comet of 1818 having drawn his attention to astronomy, he had proceeded to study that science, but he had no telescope with which to gratify the curiosity his studies had aroused. He therefore entered into an arrangement with a watchmaker in whose house he resided, by which, in return for instruction in mathematics and physical science, he was taught the arts of turning and grinding; he was thus enabled to construct for himself a reflecting as well as a refracting instrument, the glasses for both of which he ground with his own hands.

It was not until 1827, when Schafhäutl was twenty-four years of age, that there came a turning point in his career. Scheifele, the Rector of Ingolstadt, who had taken an interest in the fatherless but persevering youth, now used his influence to procure for him an appointment in the Library of the University of Landshut, a library in which were enshrined many literary treasures of suppressed Bavarian monasteries. The University of Landshut had just been transferred to Munich, so to Munich came Schafhäutl. How he revelled in the riches

of the bibliothecal shelves with which he was surrounded can easily be imagined. But Munich had for him another and a more potent attraction—its music. Not to mention its concerts and its opera, in Caspar Ett, the Court organist, it possessed a skilful performer, a man of high repute as a composer of church music, and a learned musical antiquary. Moreover, being a clever and conscientious choirmaster, he had brought the singers of St. Michael's, the Court church, into a state of unusually high training, and thus by the production of such works as the Penitential Psalms of Orlando di Lasso, an Alleluia of Handel, Allegri's Miserere, he regaled the ears of the delighted Schafhäutl with feast after feast, until the impressionable young man began to regard him with a feeling not far short of idolatry.

Schafhäutl had not been long in Munich when there sprang up the friendship which has brought his name into these pages. Theobald Boehm, who was a handsome man of prepossessing manners, was now in the prime of life and at the zenith of his reputation as a flute-player. He was not only gifted with the natural talent and temperament necessary to form a musician, but he was endowed, in addition, with the two essential requisites for an artist of the true type, intelligence and sensibility. As a performer he was remarkable for his great execution, for the beauty of his tone, for the refinement of his style, for the tenderness and delicacy of his expression, and for the skill and conscientiousness of his phrasing. Like Ett, he was a Court musician. Long before this time his artistic gifts had attracted the attention of King Maximilian, who, on the occasion of a vacancy, had taken the opportunity of introducing him into his orchestra, and placing him by the side of his former teacher and ever warm friend, Kapeller.

But the magnetic attraction of musical sympathy was not the only bond of union between Schafhäutl and Boehm; they were drawn together by a higher and a

deeper tie. Both were athirst for knowledge ; both were ready to devote themselves to the task of wresting her secrets from Nature by the tedious and toilsome process of cross-examining her through her operations ; both were eager to turn to account the information they might thus elicit. Moreover they were admirably qualified to work together. Boehm was a clever mechanic, possessed of great manipulative skill, and endowed in a rare degree with the faculty of invention ; whilst Schafhäutl was a highly trained mathematician, and a physicist well steeped in theory and scientific lore ; thus one could supply what the other needed.

To eke out his slender salary of 300 florins, Schafhäutl, under the pseudonym of Pellisov,³ began to contribute to various periodicals as musical critic and essayist. An extract from a production of his in this capacity—an account of one of the first concerts at which Boehm played on the flute which bears his name, has already been given in this volume.⁴ He did not, however, confine himself to ordinary journalistic work, but wrote, for publications of a more scientific character, on acoustical topics, such as sound, tone, and detonation ; on musical instruments in general ; on the theory of covered cylindrical and conical pipes, and German flutes.

His articles soon brought him into notice, and procured for him the acquaintance of most of the artists and composers of Munich. Amongst his essays was a paper on the Æolian harp, in which was propounded a theory which Schafhäutl conceived could be applied to the construction of the pianoforte. How he communicated his views to Boehm ; how Boehm quickly put them into a practical shape ; how the workmen who made the model, instigated by their employer, betook themselves to London and forestalled Schafhäutl's agents, Gerock

³ Pellisov, i. e. *pellis ovis*, a Latin translation of the word *Schafhäutl*, which signifies sheepskin.

⁴ *Supra*, p. 25.

and Wolf, in taking out a patent ; how, in consequence, litigation arose which obliged Schafhüttl to come to England, has already been alluded to in this work,⁵ and will be told in Schafhüttl's own words on a subsequent page.⁶

Schafhüttl arrived in London in October 1834. Here were disclosed to him the wonders of a new world. The vast life and turmoil of the English metropolis ; the rich treasures of science and art in the British Museum and other collections ; the Medical Schools ; the works for the construction of machinery and of organs and pianofortes, all on so gigantic a scale compared with those with which he was hitherto acquainted, served to confirm the opinion which he had previously formed from Boehm's description, that England was the Promised Land of technical art.

No sooner was the lawsuit brought to a successful termination than Schafhüttl and Boehm set out for Sheffield to make a study of the iron and steel works for which the town is so celebrated. At that time a method of getting rid of certain impurities, such as carbon, silicon, phosphorus, and sulphur, which have a tendency to render malleable iron brittle, was a desideratum. This was a subject with which Schafhüttl and Boehm were already conversant, they having previously attempted, but unsuccessfully, to solve the problem. They now so impressed an ironmaster that he took them under his auspices. A chemical laboratory in which the two friends were installed was set up in Mr. Hounsfeld's villa, in the suburbs of Sheffield, where they made the discovery that by introducing into the metal, when in a state of fusion, black oxide of manganese, salt, and potter's clay, the elimination of the impurities was greatly facilitated. Whether the suggestion was first made by Schafhüttl or by Boehm is

⁵ *Supra*, p. 46.

⁶ *Infra*, p. 427.

left open, for the Doctor, in his account of the matter,⁷ does not claim the discovery for himself, nor does he assign it to his fellow worker.

On the 13th May, 1835, the ironmaster took out a patent for the process in Schafhäutl's name. In the specification he is described as Charles Schafhäutl, gentleman, of 77 Cannon Street, in the City of London, but the document appears to have been executed at Sheffield. In June, Boehm left England to make the patent powder and its use known in Germany, whilst Schafhäutl, who had resigned his post in the library at Munich, remained behind in order to introduce it into various foundries at Sheffield and Birmingham.

But the Patent Office shows that another project connected with the iron industry had engaged Schafhäutl's attention. The conversion of *pig* into *bar* iron, as the purification of the cast iron which runs from the blast furnace is called, is effected by an operation termed *puddling*. The cast or pig iron, having gone through the preliminary process of *refining*, is fused in a reverberatory furnace, the materials to aid in the purification (the salt, the potter's clay, and the manganese dioxide of Schafhäutl's patent, or some one of the other substances which have since been recommended) being added. When first fused the metal is comparatively liquid, but as it boils giving off bubbles of carbonic oxide, it thickens by degrees until it is converted into a semi-solid mass of a pasty or porridge-like consistence. Throughout the operation a half-naked workman or *puddler*, furnished with a *rabble* and a *paddle*, as his tools are termed, watches the contents of the furnace, keeps them constantly stirred, and, when he considers that the process is complete, or to use his own phrase, when the metal has *come to nature*, collects it and forms it into *puddler's balls*.

⁷ *Infra*, p. 431.

The object which Schafhüttl had in view was to work the puddling or stirring tool by machinery instead of by hand, so that "a larger puddling furnace might be used, and more work done in a given time." There is a drawing of the apparatus in the specification of the patent. It shows an elaborate machine with wheels, rods, bars, cranks, and levers, by means of which, motions both transverse and longitudinal, similar to those given by the hand of the puddler, are imparted to the stirring-tool. Whether or not Boehm, to whose "marvellous gift for combination" the Doctor bears testimony, had or had not a hand in the invention, can now be only a matter of conjecture. But when one considers that the puddler's work is so exhausting that it has been pronounced to be probably the most severe labour in the world, it can occasion no surprise that since Schafhüttl's time many mechanical rabbles, as such contrivances are called, should have been brought forward with a view of lightening his task; indeed it has been proposed to cause the furnace itself to rotate. In fact, so revolutionised has been the manufacture of iron of late years that the operation of puddling has been to a great extent superseded, and threatens ere long to entirely disappear.

The patent was taken out on the 13th of June, 1836, by which time Schafhüttl seems to have left Sheffield, and to have gone to reside at Dudley in Worcestershire. Notwithstanding the heavy-claims which iron must have had on his time, we have evidence that he did not allow music to be overlooked. From 1834 to 1836 the 'Allgemeine Musicalische Zeitung' of Leipsic published contributions from his pen on Catholic Church Music, on the York Musical Festival, and English Music in general, and on The English System of Organ Construction, and the large Organs of Birmingham and York.

During the next year, 1837, Schafhüttl paid a visit to France, where he taught the improved puddling process in the large French ironworks such as those of Terre

Noire, Creuzot, and Alais. He then made geological excursions to Arles, Avignon, and Marseilles. Afterwards he proceeded to the deep valleys of the Pyrenees. To this remote region the art of puddling had not found its way, although it had been known for half a century, it having been patented by Cort, its inventor, in 1784. Schafhäutl attempted to introduce it, but he was not successful; indeed it is said that to this day the production of iron is here effected by the old Catalan forge; a method not unlike that which is practised in such countries as Borneo and Madagascar, and believed to be substantially the same as the Roman way of smelting.

On his return to England, Schafhäutl undertook an elaborate and exhaustive examination of the chemical composition of iron and steel. He embodied the results of his researches in a paper which he read at the meeting of the British Association in 1839. So important was this investigation considered to be that Sir David Brewster, the editor of the 'London and Edinburgh Philosophical Magazine,' published it at full length in that periodical, although it was necessary to give up to it nearly sixty pages⁸ of the magazine. The next year Schafhäutl again attended the meeting of the British Association and read papers in the Chemical section. As the meeting was held at Glasgow, he took the opportunity of making a tour in the Scotch Highlands.

By the year following, 1840, the ubiquitous Schafhäutl had removed to Swansea, whither he had been taken by Charles Manby, the engineer. He was engaged in investigating by means of chemical analysis the metallurgy of copper, and was studying the geology of the district, and making experiments with the Welsh anthracite or smokeless coal. The outcome of this visit to Swansea

⁸ 'On the Combinations of Carbon with Silicon and Iron and other Metals, forming the different species of Cast Iron, Steel, and Malleable Iron.' By Dr. Schafhäutl, of Munich. 1839-40.

was a patent which was taken out in January 1841, by the Doctor in conjunction with Charles Manby's brothers Edward Oliver Manby and John Manby for "the construction of puddling, balling, and other reverberatory furnaces for enabling anthracite, stone coal, or culm to be used as fuel."

Schafhäütl had now been resident in England for seven years. In November 1835, he had received the degree of Doctor of Philosophy, and in March 1838, that of Doctor of Medicine.⁹ He had been elected an Associate of the Institution of Civil Engineers,¹⁰ and for his communications to that Society, on a new universal photometer,¹¹ and on the circumstances under which explosions frequently occur in steam boilers and the

⁹ These degrees are said to have been conferred on Schafhäütl by the University of Dublin, but the statement involves a seeming impossibility, inasmuch as the degree of Doctor of Philosophy is one which that university has never granted. Nor can Schafhäütl's name be found in the list of Dublin Doctors of Medicine. But although there is little likelihood that either of the degrees was of British origin, there can be no doubt that Schafhäütl began to be styled Doctor during his residence in England. That he was officially recognised in Germany as a Doctor both of Philosophy and Medicine is evident from the words italicised in the following, which is taken from his diploma of "Doctor Scientiarum Politico Oeconomicarum"—an honorary degree which he received from the University of Munich in 1860:—"viro excelsi ingenii, tam in literis quam in artibus versato, collegæ carissimo, domino Carolo Francisco Aemiliano Schafhaeutl, Ingolstadtensi Bojo, *philosophiæ et medicinæ Doctori*, geologiæ et rei metallicæ professori publ. ord., bibliothecario supremo in Universitate, Academiæ scientiarum Regiæ in ordine sodali, Musei geologici in Academia Conservatori, Ordinis meritorum civilium St. Michaelis, Honoris Legionis Franco-Gallicæ Equiti rel. rel. ob vastam ac exquisitam scientiam doctrinamque præsertim in re montana et metallica honoris causa—"

¹⁰ His election took place on the 9th of February, 1841. He was described as Charles Schafhaeutl, of Augsburg, Doctor of Philosophy and Medicine.

¹¹ *Proceedings of the Institution of Civil Engineers*, vol. i. p. 101.

causes to which such explosions may be assigned,¹² he had received the Telford Medal. Not to mention private friends, he had made the acquaintance of many distinguished men, such as Thompson, Tennant, Murchison, Lyell, Brunel, and Stephenson. It seemed then as if he had made a new home for himself in this country; but the love of the Fatherland proved too strong; in June 1841 he returned to Munich and rejoined his old friend Boehm. The Boehm family occupied a flat in a building which had once formed part of one of the religious houses in which before the suppression of such institutions in Bavaria, Munich abounded.¹³ It had been the residence of Boehm's father, and it is still in the possession of the family, it being inhabited by Boehm's daughter and one of his sons.¹⁴ To this abode Schaufhäutl was welcomed by Boehm, and here he passed the forty-nine remaining years of his life.

From this time forward the biography of Schafhäutl becomes one long record of his unceasing activity. He at once resumed his chemical researches in the laboratory of the Royal Academy. In defence of the opinions put forward by his old friend and instructor in chemistry,

¹² *Transactions of the Institution of Civil Engineers*, vol. iii. p. 435; also *Proceedings*, vol. i. p. 103.

¹³ Munich, the Villa Munichen, or *Forum ad Monachos*, received its name from the circumstance that the ground on which it stood was owned by monks.—C. W.

¹⁴ On the 9th of April, 1894, it was the scene of an interesting celebration. A festive gathering of the now very numerous Boehm family was held in it to commemorate the centenary of Boehm's birth. After the family coffee, one of Boehm's youthful descendants recited some verses which he had composed in his great grandfather's honour, and the head of the family, Herr Ludwig Boehm, in an eloquent speech recalled the chief incidents of his father's career, and held up his life as a pattern for the imitation of his younger listeners. A glass of champagne was then drunk in silence by each present in memory of the departed. Music and dancing followed.

Joh. Nep. Fucks, he plunged into a controversy which had broken out in the scientific world on the nature and origin of volcanoes. Immediately after his return from England he was placed on the Committee of the Munich Polytechnic Association, as a member of which he continued for thirty years, as the journal of the Association testifies, to contribute reports and to read papers on subject after subject at the evening meetings. In 1843 he was appointed to the Professorship of Geology and Metallurgy in the University of Munich, a chair which, in addition to the professorial work, involved the duties of Keeper of the Geological Collections of the State. In the previous year he had been received as a member of the Royal Bavarian Academy of Sciences.

But post after post of a more practical kind began to fall to the lot of this useful man. He acted as Bavarian Government Commissioner at the Industrial Exhibition held at Mayence in 1842, at Leipzig in 1850, in London in 1851, at Munich in 1854, and at Paris in 1855, assisting at the adjudications and drawing up detailed reports. He was also placed on a commission which King Ludwig I. sent to Pompeii, when in 1842 he erected the Pompeianum, a copy of a Roman villa, in the park at Aschaffenburg. In examining the remains of ancient architecture which the excavations had brought to light, Schafhüttl ascertained that the brilliancy of the walls in the baths of Herculaneum and Pompeii is produced by the way in which they are plastered, not by means of wax.¹⁵ On the establishment of the Bavarian State Railways in 1844, he was nominated commissioner for

¹⁵ The matter is discussed by the Doctor in some remarks 'On the Theory of the Setting and Hardening of Mortars, and the Polished Stucco of the Ancients,' appended to a paper entitled 'Portland and Roman Cement. A Contribution to the History of Cements and Hydraulic Mortars.' There is a copy of the paper in the original German, with a manuscript English translation, in the library of the Institution of Civil Engineers.

testing locomotive boilers; the work thus thrown upon him was afterwards increased by the addition of the official control of the boilers of Upper Bavaria, so that before the end of his life he had tested more than two thousand steam boilers. In 1849, he undertook another Inspectorship for the Government of Upper Bavaria, that of the construction and erection of church organs, in the discharge of his duties giving judicial opinions which amounted from first to last to over four hundred in number. In the midst of all these avocations he found time to act from 1845 as examiner of the technical schools of Munich and Augsburg, in the capacity of Government Commissioner for these institutions.

Amongst the appointments which were showered upon Schafhäutl there was one which it gave him especial pleasure to accept, that of chief librarian to the University of Munich. During the seven years he had spent in the library, in the subordinate office of secretary, he had become intimately acquainted with its contents, and had learnt to appreciate its value. To provide suitable catalogues for its three hundred thousand volumes, and to arrange and display its manuscripts and incunabula—a work which extended over ten years—was to him a labour of love.

There still remains to be mentioned an undertaking which probably entailed on the indefatigable Schafhäutl more trouble than any one of his many other occupations. He was nominated President of the Geological Section of a Royal Commission, which was appointed in 1849 for the scientific examination of Bavaria, in which capacity he devoted himself for nearly forty years to the formation of a more complete National Geological and Mineralogical Collection by visits to the Bavarian mountains, by purchases from exhibitions, and by obtaining contributions from Bavarian foundries. In connection with this subject, not to mention communications to periodical publications, he produced in 1851

a work entitled 'Geological Researches in the South Bavarian Alps,' and in 1863 a 'Lethæa Geognostica' of South Bavaria, with an atlas containing 100 plates.

Amidst all these diverse and distracting pursuits Schafhäutl never lost sight of music. Up to within a few years of his death he was a constant attendant of concerts and operas, although, like Boehm, he could never reconcile himself to the innovations of Richard Wagner. He gave lectures on Ancient Music; on Mozart in relation to his predecessors and successors; on the Nature of Music and the so-called Music-Painting. He wrote papers on Casper Ett; Joseph Haydn and Gluck; Tannhäuser and the Music of the Future; Vogler's celebrated Organ of St. Peter's; the Abbé Vogler: a biography; Meyerbeer's 'Africaine'; Church Music at Munich; Major and Minor in Nature; and even on the abstruse subject of Chinese Music. Indeed, so incessantly did he ply his pen, that there were enumerated in the Almanac of the Bavarian Academy of Sciences of 1884, more than two hundred of his literary works, and in that of 1890 there appeared a supplementary list. Meantime, his labours did not pass unrecognised. In addition to the University degrees which were conferred on him, and the honorary membership to which he was invited by learned societies, he received from Bavaria two decorations, the Order of Merit of St. Michael, and the Cross of Knighthood of the Order of Merit of the Bavarian Crown; from Prussia the insignia of the Order of the Red Eagle; and from France the Cross of the Legion of Honour.

At length, signs that the great Leveller with his scythe was slowly but surely drawing near to the abode of Boehm and Schafhäutl began to appear; but the hand of Time, irresistible though it be, was powerless to quench the fire of the old men's energy. Weak and stiff grew Boehm's lips, so that he was forced to resign

an older friend than Schafhäutl, his flute,¹⁶ but he sought still to impart the secrets of his art by the aid of the tremulous notes of his now feeble voice. Dim and more dim waxed Schafhäutl's eyes, yet hour after hour he sat, pen in hand, at his desk, though he could no longer decipher the words the pen had traced. The parting of the two friends was long delayed. It was not till 1881 that Boehm was called to his last rest; Schafhäutl followed him in 1890, in the same year of his age, the eighty-eighth.

Notwithstanding the strain Schafhäutl must have put on his mental and physical powers, he enjoyed excellent health till within a few days of his death. Moreover, he was a living refutation of the popular belief that much work engenders dulness. Gifted with a happy vein of humour, and possessed of an inexhaustible fund of anecdote, which his extraordinarily good memory placed always at his command, he was a great favourite in society. His presence was highly appreciated at the jovial gatherings of "Old England," a festive club, which numbered amongst its "Lords," as the members were termed at their banquets, many of the nobility and of the most distinguished men of Munich. For the last twenty years of his life he gave up his mountain excursions, and spent his summer holiday at the Benedictine abbeys of Saltzburg, and Einsiedeln in Switzerland, where he was received with open arms; the genial disposition, the good stories, the strict attention to religious observances, and the fraternal sympathy of the old bachelor rendering him an ever-welcome guest. He was very popular with the choir of St. Michael's Church. For fifty years he was present with them on the occasion of Church festivals, his advice being always sought as to the music to be performed. On his eightieth birthday (a day on which

¹⁶ *Infra*, p. 477.

the magistrates of Munich offered him an address of congratulation) they presented him with a souvenir of their regard, and at his funeral performed a requiem in his honour.

For so busy a man as Schafhüttl to find time to verify every statement he made was a physical impossibility. And, in addition to the want of accuracy inseparable from too many undertakings (a habit which, once established, has a tendency to drift into culpable carelessness) he laboured under a twofold disadvantage, his writing was difficult to read, and his eyesight was exceedingly imperfect. To these causes may be ascribed many of the errors which are to be found in his works. A bad hand is an especial misfortune for one who, like Schafhüttl, contributes to periodicals, for in such publications, the author seldom has an opportunity of revising the proofs. In quotations from the Doctor's articles given in this volume, the reader may notice many misprints, due to the difficulty experienced in deciphering his manuscript, such as Rapelle for Kapeller,¹⁷ Daru for Dorus,¹⁸ Cloche for Coche,¹⁹ remué for réunis, attaquaient for atteignaient.²⁰ Amongst the mistakes attributable to his defective vision there is a ludicrous blunder in his account of a concert in which Boehm took part; he so misread the programme as to credit Boehm with playing an air which was sung by a lady vocalist.²¹

We are indebted to Schafhüttl, as I have already mentioned, for an extract from a lecture published in Schweigger's 'Jahrbuch für Chemie und Physik' (1833-1834), on the theory of covered cylindrical and conical pipes and German flutes. When Lord Rayleigh or some other competent physicist shall turn his attention to the subject, the theory put forward by the Doctor will, no doubt, be examined, and an opinion expressed as to how far he may be considered to have been

¹⁷ *Supra*, p. 161. ¹⁸ *Infra*, p. 434. ¹⁹ *Infra*, p. 440.

²⁰ *Infra*, p. 424.

²¹ *Infra*, p. 399.

successful in his attempt to grapple with the complex phenomena with which it deals. One of his papers, however, is of interest to flute-players generally, inasmuch as it bears on a subject which is with them a matter of almost daily discussion, viz. whether the tone of a flute is or is not affected by the material of which the instrument is made. The paper, which was published in the 'Allgemeine Musicalische Zeitung' (Leipzig) of 1879, is far too long to be reproduced in these pages, but I will give an account, as brief as may be, of two or three of the experiments described.

Dr. Schafhäutl commences his essay with a quotation of some length in which the writer considers it extraordinary that such a "myth" or "superstition" as the belief that the material of a wind instrument exercises an influence on its sound should still exist. The choice of the material to be selected was a question, he said, not of the quality of the sound it gives, but of such considerations as its strength, beauty, handiness, or price. He admits, it is true, that Gladni (Chladni), at the beginning of this century, still believed somewhat in a weak resonance of the zinc or wooden wall of a pipe, but he adds, "as a matter of fact, however, the wooden or brass sides of a clarinet or of a trumpet do not vibrate, but only the column of air which is enclosed within them; and three flutes, one of which is made of silver, another of glass, and another of wood, give out exactly the same sound. That is a fact which rests on incontrovertible acoustic laws which can be proved by any trials, and with regard to which there ought to be no more discussion."

The Doctor proposes to refer this oracular dogma from Science to Nature. "In order," he writes, "to allow Nature herself to speak on this interesting question, I selected a wooden organ pipe, which nearly gave the G (or more nearly the G sharp of our old high pitch). The body of the pipe was 72·2 centimetres long from the

plug to the open end ; in the inside diameter at the lip 47·0 mm. wide, and 58·5 mm. broad ; we have therefore a parallelogram of 2749·5 square millimetres in superficial area. The wood of the body of the pipe was one decimetre (?) thick, which thickness likewise, of course, formed the width of the natural beard."

After a further minute description of the pipe the Doctor continues as follows :—

"Then I had a rectangular prism made, which exactly filled up the body of the pipe, i.e. the interior space of the pipe, and over this prism I had three metal pipes constructed, three pipes which, of course, perfectly resembled each other, one of which consisted of tin, one of lead, and the third of zinc. The tin pipe was of the usual thickness in metal of the principal pipes of this size, namely 1 mm. The thickness of the lead pipe had to be somewhat greater, as it could not otherwise have been kept in shape, because of the softness of lead ; it amounted to 1·3 mm. The zinc pipe consisted of rolled sheet zinc, 0·5 mm. thick."

The three metal pipes, which were so constructed as to resemble the wooden pipe "exactly in every detail," were placed side by side with it on a wind-chest. The four pipes thus placed were then blown at a given pressure of wind with the following result :—

"The wooden pipe did not quite come up to the height of the G of our old orchestras, whose A made 896 vibrations. The wooden pipe made 404·98 oscillations at 10° Réaumur.

"According to Science we must, of course, conclude that all pipes which are made alike down to the minutest detail, will also make 404·98 oscillations ; but Nature gave a totally different reply to our question.

"The tin pipe made at the same time 398, the leaden pipe 390, and the zinc pipe 382 oscillations ; i.e. the zinc pipe was quite half a tone lower than the wooden pipe. The tin pipe almost came up to the height of the G of

our earlier orchestra pitch, the A of which reached 896 vibrations. It was about one-third of half a tone, and the leaden pipe about two-thirds of half a tone too deep.

“As here all the circumstances under which the four pipes gave their tone resembled each other, and only the material of which the pipes were made, varied, the natural conclusion is that the various materials of which the pipes were made were the cause of the various tone-quantities of the pipes with regard to their height and depth.

“In order, therefore, to bring the three metal pipes—the tin pipe, the lead pipe, and the zinc pipe—to the same height of tone as the normal wooden pipe, it was necessary to cut off 1·5 cm. from the tin pipe, 3·5 cm. from the leaden pipe, and 5·75 cm. from the zinc pipe.

“It is very easily proved that the vibration of the walls of the pipes as a whole is the cause of the lowering of the tone in the pipes. For instance, I wrapped up the zinc pipe as tightly as possible with list, and it rose in tone higher than the G of the French pitch by six vibrations, therefore, by a quarter of half a tone, whilst before that it had stood below the G of the French pitch. At the same time the vibration of the pipe could be felt as strongly through the wrappers as when the bare pipe was held in the hand.

“Here one sees the powerful influence of the material on the quantity of the vibrations or on the height of the tone, of which one had no suspicion previously. In order to demonstrate this influence still more clearly, I took a zinc pipe of the above-named dimensions, only it was about 5 mm. longer, and enclosed it in a second zinc pipe similar to the first in its dimensions, but about 2 cm. (?) wider, which, therefore, stood off from the actual pipe by about 2 mm. (?); the two substances were connected together underneath by a watertight foundation of zinc. The space 2 cm. wide between the two pipes could be

filled up with any substance one chose, in order, as it were, to thicken the wall of the pipe to 2 cm. The outer body of the pipe could, of course, not be brought quite down to the level of the plug on account of the mouth, together with the lip; it was therefore connected exactly above the upper edge of the lip, consequently $70\frac{1}{4}$ mm. above the plug, by means of a horizontal watertight zinc bottom, with the inner or principal pipe. This double rectangular pipe had now a deeper tone than the single pipe of the same length.

“The free, single zinc pipe was now 0.77 of half a tone higher than the F sharp of the normal scale; the double one, on the other hand, was only 0.45 of half a tone over F sharp. In sounding, the outer pipe vibrated strongly and visibly.

“The space between the two pipes was now slowly filled with water. The tone was at first powerful, but as the water rose higher the octave of the fundamental note began to mingle with it at the same time and at last to appear quickly changing, and when the water stood 9.4 cm. high in the intervening space the first octave, namely G, was produced instead of the fundamental note, for which exactly a litre of water was required. When the water got to nearly that height and the octave was produced alternately with the fundamental note, it sufficed to place the finger on the upper edge of the strongly vibrating outer pipe in order to produce the octave without its fundamental note. As soon as the water in the intervening space rose higher the fundamental note again sounded pure, but in such abundance as was never produced by the mere pipe itself. I now poured in water until it had reached over 30 cm., reckoning from the bottom of the outer prism, or the outer pipe; and now the double octave began to appear alternately with the fundamental note, as in the first octave, until its double octave appeared pure and full at a height of 36.3 cm. of the water. When more

water was poured in, the double octave soon made way for the fundamental note, which again appeared very powerful ; but the fundamental note had now become nearly a half tone, 0·917 of a half tone higher.

“The intervening space which the water filled was now filled up with gypsum. As gypsum grows hot in congealing and solidifying the water, the height of the tone could not be measured during the period of congelation ; but meanwhile, before the pipe had grown quite cold, the tone had not yet reached the height of the tone of a similar cylindrical pipe, which will be mentioned immediately.

“The double pipe sounded a vibration higher than the G sharp of our pitch after it had grown cold, taking the A at 870 vibrations. The double pipe which was filled with gypsum had thus become 0·850 of a half tone higher than the double pipe filled with water, and 1·77 of a half tone higher than the free double zinc pipe. On the other hand, the tone of the double pipe with the water wall was full and had a clear sound, the tone of the gypsum wall had become thin and earthy ; it had totally lost the full, strong, round sound of the water wall.

“We see here what a powerful influence the material of which the pipes are made exercises not only on the quantity, i.e. the height of the tone, but also on the quality.

“The material of the body of the pipe, therefore, does not only alter the tone in its height and depth, but it also considerably alters the tone in its quality. The tone of the pipe the wall of which consists of water, the molecules of which are so mobile, produces an extremely round, full sound ; the gypsum wall, on the other hand, gives forth a dull, poor, dry tone without any music.”

I pass over the next experiment. Suffice it to say, that three cylindrical pipes were taken, one of tin,

another of lead, and a third of zinc. They were so constructed as to be exactly alike in their dimensions. On sounding the three pipes it was found that instead of yielding notes differing from each other in pitch as did the rectangular pipes, they produced notes of the same pitch. Dr. Schafhäutl adduces at considerable length theoretical reasons with a view of accounting for this difference in the behaviour of the rectangular and the cylindrical pipes, and then resumes as follows :—

“If the relation (*Verhältnis*) of the oscillations of the walls of the body of the pipe with the oscillations of the air column is close (*grosses*), the vibration of the walls has only a disturbing and retarding influence on the oscillations of the air column, as we have chiefly noticed in our rectangular zinc pipes. But if the relation between the oscillations of the walls of the body of the pipes and the vibrating air column is less, the oscillating walls have such a disturbing influence on the oscillations of the air column that the formation of a clear musical sound is not unfrequently prevented. We unfortunately see this only too often corroborated in the deepest pipes, the so-called 32-foot pipes of our largest organs. There are few pipes 32-feet long in existence which emit this 32-foot note clearly and certainly. Vogler says that he scarcely ever heard a decidedly correct note from a pipe which was more than 16 Rhenish feet high, but instead of it only a certain humming; and this is the reason why organists declare that the 32-foot note only takes effect when one draws its octaves, 16 and 8 feet, to it. I myself formerly never heard a really clear decided 32-foot note from the 32-foot pipe of an organ. Walker of Ludwigsburg was the first who exhibited a 32-foot C at the Munich Industrial Exhibition, the sound of which, with its aliquot parts, could be heard at a distance of a thousand yards from the glass palace. Walker had discovered the cause of his former failures and his present success quite correctly. The cause, as we have

shown just now, lies in the fact that the greater portion of the 32-foot pipes in our organs have walls which are much too weak and thin, and that they are, therefore, as Walker expressed it, only ciphering. Walker made his pipes cylindrical, of strong wood, and covered them with thick zinc. The 32-foot pipes of zinc, such as are *e. g.* in the corner doors of the celebrated organ at Weingarten in Suabia, which stand out from the front, have above all an upper lip which is far too weak for it to be possible for a decided note to be produced, even if the pipes possessed the requisite thickness of metal. The large, magnificent 32-foot zinc pipe of nearly 50 cm. in diameter in the cathedral organ at Lucerne is also much too thin; the celebrated Swiss organ-builder, Haas, had the greatest difficulty in making it speak when the old organ was altered into the present grand new one."²²

* * * * *

“Any one who has ever touched an organ pipe when it was sounding, whether it were a wooden or a metal pipe, will be sure to have remembered how powerfully the sounding pipes vibrate and tremble. It is not, however, so much the height of the tone as the quality of the tone, the tone colour, which depends on this

²² In the earlier part of his paper Schafhäutl mentions that when he was acting as Bavarian Ministerial Commissioner in London at the Great Exhibition of 1851 he met Schulze, the organ-builder of Paulinzelle. In a conversation which took place, “I remarked,” says Schafhäutl, “that the German and English measurements, especially for the lowest basses of the organ, were very different to each other; that the 32-foot pipes in Germany were generally made much narrower and with thinner walls than the English. Schulze replied, “Töpfer, who wrote the well-known work on organs, was opposed to the wide-measured basses.” I said, “Just come with me,” and I took him to Williams’s (Willis’s?) large organ, and let him hear the sub-bass. “Did you ever hear such a bass note?” I asked him. “No.” “Then just look at the dimensions of this sub-bass.” Schulze remained silent for some time, looking at the pipes, and then said quickly, “For the future I also shall make such broad basses.”

trembling in cylindrical pipes. The Abbé Vogler employs a very characteristic phrase here when he says, "The pipes must be grasped by the wind." One need not even touch the pipes. If the principal pipes in an organ, *e.g.* are moved to the front on account of the deeper tone, and have come too near together, immediately there ensues a very disturbing rattle of the sounding pipe, which touches the next pipe in its vibrations. One can even convince oneself with one's hand of the quality of any tone that a pipe emits. The wooden pipe vibrates the least, its tone is therefore dull; the zinc pipe vibrates most vehemently, and therefore its sound is the strongest and finest. The pipe made of inelastic lead also vibrates very considerably when it sounds. We have then the irrefutable proof that the material of which the pipe is made has a considerable influence even on the quantity of the sound, which was not even surmised hitherto. But the quality of the sound is also so varied according to the material that it strikes even an unmusical ear.

"The tone of the wooden pipe is strong but dull; the tone of the zinc pipe, on the other hand, the clearest and fullest; the tone of the leaden pipe is stronger than that of the wooden pipe, but not so clear as the tin pipe. The tone of the zinc pipe is fresher and more vigorous than that of the wooden pipe, but not so melodious as that of the tin pipe.

"I will adduce further proofs, from facts, of the influence of the material on the tone of the pipes.

"In the organ of St. Michael's Court Church at Munich, which was built about a hundred and fifty years ago by the celebrated organ-builder Fuchs in Donauwörth, and was afterwards altogether altered in the year 1814 by Vogler himself according to his system of simplification, there ~~was~~ ^{is} a bourdon, a lip pipe, in the lower manual, which possesses the character of the most charming bassoon tones.

“When the well-known Professor Dr. Joseph Fröhlich, of the University of Würzburg, who was the founder and director of the School of Music in Würzburg, was present at an ornate High Mass in St. Michael’s Court Church in Munich, he remarked, after service, to the well-known Caspar Ett, who was at that time organist of that church, “I say, your bassoonist elicits most charming sounds from his instrument.” Ett smiled, and convinced him, incredulous though he was, at last by ocular demonstration, that the bassoon-player who had produced those charming sounds had been he, the organist himself, and besides him, the bourdon which he had played. It was well known that Fröhlich was a very finely educated musician who was very frequently hypercritical in his demands on musicians and their musical execution, and difficult to satisfy. It lay in the nature of that philosophical man that his judgment was rather too severe, than too lenient.

“The bourdon, which really imitates to perfection a beautiful bassoon tone, is a narrowly mensurated flute work: the proportion of its width to its depth is as 1 : 1.5; the front side which has the languette and the mouth is of pine wood. The height of the mouth to the width is as 2 : 2.33. The side walls are rather thinner than the walls at the back. The wood of the pipe is so dry and brittle than one can guess the tone of the pipe by merely tapping it smartly. But a new pipe, made exactly after the same dimensions, emits the usual flute-tone of the bourdon; and a wooden lip stop has never been constructed whose tone could remind any one of that of the bassoon. It is the brittle wood, or rather it is the molecules of the wood, which cause the characteristic bassoon-like tone of the pipe.”

In another part of his paper the Doctor relates how he had seven trumpets made, each of which gave the C of the third orchestral octave, and describes the expedients to which he had recourse in their construction

in order that the cavity of the interior should be of the same shape and dimensions in all of them. The first was of brass 0·52 mm. thick; the second was also of brass but was somewhat thicker, it being 0·85 mm. thick. The third was of lead 11 mm. in thickness. The fourth consisted of a pyramidal mass of gypsum. The remaining three were made of pasteboard of different degrees of thickness. On the trumpets being blown by a skilful trumpeter "we seven times heard," writes Schafhäutl, "the same C of the third octave, with always the same overtones, but what a difference between the sound-colour of the notes! The trumpet made of brass 0·85 mm. thick gave the clearest tone; the trumpet of brass 0·52 mm. thick gave a noticeably thinner tone. The tone of the leaden trumpet was strong but dull; the tone of the paper trumpet sounded papery, and excited universal laughter; but it was the trumpet note C with all its overtones."

PLATE VIII.



BOEHM WHEN AN OCTOGENARIAN

SCHAFHÄUTL'S
LIFE OF BOEHM.

THE following memoir appeared in the 'Allgemeine Musikalische Zeitung,' of Leipsic, during 1882, the year after Boehm died. A copy of it was handed to me by Mr. W. P. Mills, who received it from Mr. Walter Broadwood, to whom it had been presented by the author, Dr. Schafhäutl. It has been translated into English by Dr. Emil Reich, and I have added a few notes.

Flute-players will value this biographical sketch for the personal incidents in Boehm's career with which it abounds. Such incidents cannot be without interest to those who are brought into daily and hourly association with Boehm's ideas, as is every one who plays on an open-keyed flute. Unless I have mistaken the disposition of my brother flautists, they will not be extreme to mark anything that Boehm's aged biographer may appear to have done amiss, either in his composition, his history, his chronology, or his science. They will only see in the stanch old man the loyal and devoted friend, eager, as long as his trembling hand can hold the pen, to defend Boehm from the attacks made upon him, and incapable of even thinking that any one "can seriously believe" what has been said against him by his jealous rivals. They will be to his virtues very kind, and to his faults, should there seem to be any, a little blind. They

will leave the scalpel and the dissecting-room to Mr. Rockstro, and, choosing the better part, will content themselves with strewing flowers on the grave.—C. W.

THEOBALD BÖHM :

THE LIFE OF A REMARKABLE ARTIST.

By PROFESSOR DR. VON SCHAFHÄUTL.

Translated from the German

By DR. EMIL REICH.

Amidst the infinite variety of individuals there may be observed single minds that distinguish themselves from the rest by a stamp of their own, pursuing, as they do, particular directions to which their original bent leads them. Amongst them may sometimes be found men who reach their goal by more than one path, excelling equally in various pursuits.

In the latter class of rare genius we must place him whose career and work we are about to consider, who, after a life of unremitting toil, has left this world in his eighty-ninth year.

His birth takes us back to the end of the eighteenth century, when Bavaria was ruled by Karl Theodor. At that time the sultriness of the emotional atmosphere of our days was unknown. The political tempest of the west of Europe, and the horrors of the French Convention had begun to affect seriously the nerves of potentates; the countries on the eastern confines of France had already commenced to reap some of the fruits of the struggle for liberty and equality. Karl Theodor was not only Elector of the Palatinate, but also Duke of Jülich, Cleve, Berg, &c., and between 1792 and 1799 he ceded to the French his lands on the

other side of the Rhine, namely, the Rheinpfalz, Jülich, and Zweibrücken.

About that time there lived at Munich a celebrated goldsmith and jeweller called Karl Frederik Böhm, to whom a son was born on April 9th, 1794,¹ who received the name of Theobald, and was, of course, intended to carry on his father's business. Our Theobald was just four years old when the old Elector, Karl Theodor, died, the ruling Duke of Zweibrücken, Maximilian Joseph, succeeding to the throne of Bavaria.

Poor Bavaria, without money or friends, was compelled to ally herself with the victorious Napoleon. Out of gratitude Napoleon, by the Proclamation of January 1st, 1806, erected Bavaria into a kingdom, establishing at the same time the so-called Rhine-league, whose protector, or rather governor, he became, and by a stroke of the pen on August 1st, 1806, he put an end to the German Empire, which had existed for more than a thousand years.

Young Böhm was by that time the boldest and most expert amongst his comrades at climbing and jumping, and very clever all round, spending his leisure hours amongst the soldiers, or in his father's workshop, where he obtained a little work-table of his own. He soon became perfectly familiar with the sparkling jewels, and neither his eye nor his judgment could easily be deceived. He also attended the famous drawing-school of Prof. Mitterer, and quickly reached the first place among the pupils; this accounts for the fact that his designs of jewelry, bracelets, and such like were always noted for good taste and elegance. Young Böhm left the beaten track in all he did. When his father would interfere with him, saying, "That will not do that way," he only

¹ Dr. Schafhäutl is here at variance with himself. If Boehm died in his eighty-ninth year, as he has just stated, and as he again states at p. 475, he was born in 1783, not 1784. The subject of Boehm's age has already been discussed in Note 1, p. 3.

replied, "Father, just let me do it in my own way." His father gave in, and the result was that the work came out more rapidly and better finished than from the hands of the best of his workmen.

In his fourteenth year, in 1808, Theobald Böhm was, as a goldsmith and jeweller, of consummate skill. It was on his account that his father was intrusted with the repair of articles from the Royal Treasury, and was appointed jeweller and purveyor of fancy articles to the Court; nay, even the celebrated anatomist and physiologist Sömmering, who, in 1808, was a member of the Bavarian Academy of Sciences, availed himself frequently of young Böhm's talents, in preparing skeletons, the articulations of which were to be movable as well as invisible.

BÖHM AS PUPIL OF THE FLUTE-PLAYER KAPELLER.

When yet a child, Böhm was exceedingly fond of music, and his first instrument was a flageolet, which, however, he soon abandoned, commencing to play on the flute. In 1810, the young artist constructed his own flute after the model of an instrument with four keys from the workshop of the celebrated Karl August Grenser, of Dresden. All his neighbours bore unwilling testimony to his enthusiastic ardour. Amongst them there was an excellent flute-player, a member of the Court orchestra, one Johann Nepomuk Kapeller. One day he met our incipient virtuoso on the staircase, and laughingly said to him, "You young flute-player, I can no longer stand your noise; come to me, I will show you how to set about it." Young Böhm thought he heard the voice of an angel. He gratefully accepted the proposal and became for two years the most painstaking of Kapeller's pupils. He also constructed new flutes for himself and his teacher—both working at the improvement of the faulty old flute. They attempted to equalise the purity

of the scale in the higher and lower registers, and to make the embouchure movable. Karl Maria von Weber, who made a trip from Darmstadt, where he studied under Vogler, by way of Würzburg, &c., to Munich, reports on that in the 'Leipziger Musikalische Zeitung' of April 30th, 1811, according to the written declaration of Kapeller (p. 377). The invention was attacked in the same periodical of the same year by the celebrated Grenser, of Dresden (p. 778); to which Kapeller replied in the 'Münchener Gesellschaftsblatt,' 1812, No. 1, proving that Grenser did not know Kapeller's flute. The very ingenious mechanism of that flute had been invented by young Böhm. In course of time, however, it was found that the new contrivance scarcely repaid the amount of labour spent on it, and it thus soon fell into oblivion.²

Young Böhm made astonishing progress under the tuition of his delighted teacher. After less than two years' practice his playing was admired at public recitals. One day he played a solo at a solemn morning mass in the Church of the Holy Spirit in Munich, while his master stood near the high altar. In the afternoon, when Böhm came to take his usual lesson, Kapeller asked him, "Was it you who played the flute solo this morning?" The pupil answered in the affirmative. Then said the old professor, "I congratulate you, I have nothing more to teach you." Kapeller gave up teaching young Böhm, but remained his warmest friend to the last.

² A translation of Weber's account of Kapeller's flute is given in Mr. Rockstro's *Treatise on the Flute*, section 521, p. 279. It was on this flute that the youthful goldsmith's idea, a sliding embouchure of gold, appeared, Boehm's statement regarding which gave rise to Mr. Rockstro's sarcastic remark, "He (Boehm) does not tell us that the sliding gold plate of the mouth-hole was invented by his old teacher Capeller."

The D shake key, too, which led Coche into his solitary error, "excessive generosity towards Boehm" (see p. 272), formed part of the mechanism of this flute.—C. W.

FIRST APPOINTMENT IN AN ORCHESTRA, 1812.

Young Böhm's command of the flute had become the topic of the day in Munich, and accordingly he was appointed first flautist in the orchestra of the new theatre at the Isargate, this being his first appointment. The new theatre was opened in 1812, when Böhm was eighteen years old.

At that time Munich possessed only one theatre, the *Theater an der Residenz*, the Court theatre. Originally it was intended for the Court and invited guests only. At the time of Böhm's appointment, however, it was open to the general public as well, and Italian and German operas, together with high-class dramatic performances, were given. A second theatre became a necessity for the rapidly growing population. A new theatre, in the east end of Munich, in front of the gate leading to the Isar bridge, was therefore built in the year 1811, where drama and comedy were to be performed. The director of the new theatre was Karl, an actor well known for his burlesque pieces; the conductor of the orchestra was Peter Joseph Lindpaintner,³ a worthy and

³ Lindpaintner wrote extensively for the flute. The greater part of the following works are in my own collection of flute music :—

Op. 28, Concerto, Breitkopf and Härtel.

Op. 28, Solo de Concert, Fl. and P.F., Aulagnier (an abridgement of the first movement of the Concerto).

Op. 29, Andante and Rondo, Fl. and P.F., Aulagnier (the Andante and finale, Allegro giocoso, from the Concerto).

Op. 46, Concerto, dedicated to Krüger, Fl. and Orch. or P.F., Probst also Kistner.

Op. 46, Concertino, Fl. and P.F., Aulagnier (the Concerto reduced to little more than half its original length).

Op. 47, Grand Polonaise, Fl. and Orch., Breitkopf and Härtel.

Op. 47, Grand Polonaise, Fl. and P.F., Aulagnier (abridged edition).

Op. 61, Potpourri in G, Fl. and Orch. or P.F., Breitkopf and Härtel.

Op. 61, Fantaisie brillante, Ballet de Joko, Aulagnier.

very able composer, who died on August 21st, 1856, as conductor of the Royal Württemberg orchestra. Lindpaintner was then only twenty-one years old, full of enthusiasm and ardour, and he picked out for his orchestra the best men that could be found in Munich and Bavaria. He could not fail to notice young Böhm, who thus became his friend and the glory of his orchestra.

During the day Böhm worked as a jeweller and goldsmith in his shop; in the evening he sat as first flautist in the Royal theatre at the Isargate. Böhm counted those days amongst the most pleasant of his life. There was complete harmony between the conductor and the members of the orchestra, and everything went to form a real artist's life; there was no trace of jealousy, envy, or intrigue. The theatre at the Isargate soon acquired, through its director Karl, a character for gaiety and fun, that attracted every one who liked mirth. Amongst these was King Max I. He was an old soldier, very

Op. 62, Fantaisie with a Bolero, Fl. and Orch., Haslinger.

Op. 62, Fantaisie brillante, Thèmes originaux, Fl. and P.F., Aulagnier (an abridged edition of the preceding).

Op. 67, Three Divertissements, Fl. and Orch. or P.F., Peters.

Op. 67, Three Thèmes variés, Fl. and P.F., Aulagnier (an abridgment of the Divertissements).

Op. 105, Grand Concert pathétique, dedicated to Count Éméric Wass, Fl. and Orch. or P.F., Haslinger. The flute part alone of this elaborate work covers thirteen pages.

Op. 105, Solo pathétique, Fl. and P.F., Aulagnier (an abridgment of the first movement of the Concerto).

Op. 106, Andante and Rondo, Fl. and P.F., Aulagnier (the *Larghetto affectuoso* and the Rondo of the Concerto abridged.)

Op. 120, Souvenir d'Appenzell, Fantasia, dedicated to Dorus, Fl. and Orch. or P.F., Schott.

Op. 121, Le Tremolo, Air varié, Fl. and Orch. or P.F., Schott.

Op. 122, La Straniera, Fantaisie brillante, Fl. and Orch. or P.F., Schott.

Op. 125, The Standard-bearer as a Fantasia, Fl. and Orch. (?) or P.F., Wessel.

Op. 126, Fifty Grand Studies in four books, Wessel.—C. W.

affable, of a benevolent disposition, and fond of laughing ; quite a contrast to his wife, the queen, a very highly cultured woman, who founded and resuscitated the Italian opera in Munich. King Max came very frequently to the theatre at the Isargate, even at a later period when the grand Court and National Theatre had been built in 1818. On receiving the newly appointed manager of the new Court and National Theatre, the king said to him, "If you will only take care that I may get an opportunity every week of having my laugh, and my wife her cry—as to the rest you may proceed as you please."

King Max held Böhm's flute-playing in the orchestra of the Isargate theatre in especial favour, and commanded the director to so arrange matters that whenever he should be in his box, Böhm should play a flute solo. It was therefore the king's particular wish that Böhm should be appointed member of the royal Court orchestra, even before the new Court and National Theatre was finished.

BOHŒM'S TOUR AS GOLDSMITH AND MUSICIAN, 1816. MUSICAL BOXES.

The ill-starred Russian war broke the power of Napoleon ; the battle of Waterloo, June 18th, 1815, annihilated the man himself. Louis XVIII. again sat on the throne of his fathers, and the Allies signed the second treaty of peace in Paris. At that time Böhm started, on August 1st, 1816, on his first tour as jeweller, goldsmith, and flute virtuoso, or as "goldsmith and musician" as his passport had it, to Switzerland. His goal was Geneva. He travelled by way of Winterthur, Zurich, &c., and arrived at Geneva on August 20th.

At that time the musical boxes and similar productions on a larger scale in which sounds were produced by vibrating sound-quills ("Tonfedern"), were making their way through the world. Böhm took more interest

in this new invention than in his jewels, and his first care was to make himself thoroughly acquainted with the mechanism of those toys, the precise nature of which was as yet fairly enigmatic. He therefore took job-work as simple mechanic in one of the first factories of Geneva. These musical boxes were constructed on the principle of our hand-organs, only in lieu of organ-pipes the tone was produced by the so-called sound-quills. The principle of hand-organs consists, as is well known, in a cylinder turning on its axis, on which the notes of the piece of music are represented by pins more or less wide apart driven into the cylinder; these pins touch and lift up the sound-quills at proper intervals, and thus produce the requisite notes. In musical boxes these cylinders are, of course, very tiny, sometimes to such an extent that they can be prepared only under a microscope.⁴

Driving the pins into the cylinder was a very toilsome and tedious process. Böhm invented and constructed in a short time a small machine, by means of which he was able to drive the pins into four cylinders during the time required by the ordinary hand-work for one cylinder. This circumstance drew the attention of the proprietor of the factory to Böhm. When he was showing the proprietor his new machine and the cylinders he had made, the wife of the latter, sitting at her piano, was just complaining that her flute-player, who was to take part with her in a concerted piece for the piano and flute, kept her waiting. Boehm said modestly, "With your kind permission I am willing to accompany

⁴ Musical boxes owe their small size to the circumstance that they were at first made to resemble the article from which they took their name—an article at one time as frequently carried by a gentleman as is the cigar-case at the present day—the snuff-box. The notes are produced by a sort of steel comb, the teeth of which, here termed sound-quills, are brought to a point bearing a certain resemblance to the nib of a pen. These nibs are twitched by the pins as the barrel moves round.—C. W.

you." The owner of the manufactory looked at Böhm somewhat doubtingly and said, "Do you play the flute?" "Yes." "Well then, here is the flute part, will you try it?" Böhm came with his flute, elegantly dressed, presented himself to the lady of the house with much propriety, and being invited to do so, took a seat at the music-desk near the piano. The lady played with no particular care, but she soon discovered that unless she mustered all her strength, she would be unable to follow her accompanist. The brilliancy of Böhm's tone, the surety of his delivery, were astounding. The lady and the gentleman of the house looked at each other with astonishment. "How have you attained such command of the instrument?" Böhm replied with a smile, "I am first flute at the Royal Isargate Theatre of Munich." From that day Böhm's relation to his employer became quite changed. During the day Böhm worked as a mechanic in the workshop; in the evening he appeared as a gentleman in his employer's drawing-room. He was introduced to the most prominent families of Geneva, and his art was as much praised as it was sought after. This peculiar position of his gave rise to many a comic scene. It so happened that a celebrated violinist wanted to give a concert in Geneva, whither he had come with a warm letter of introduction to Böhm's employer. The latter received the violinist with great kindness, gave him advice regarding the mode of arranging the concert, and of inviting the musicians of Geneva, winding up with, "I will introduce to you an artist who will certainly prove a great attraction to your concert." He had Böhm called; the footman went forthwith to fetch Böhm, who left the workshop in his usual working suit, the chief ornaments of which were an apron and a pair of slippers, and without washing his hands—hands that did not seem fit to be enveloped in kid gloves. "Böhm, do you mind playing the day after to-morrow at this celebrated gentleman's

concert?" "Certainly not, if you wish me to do so." The violinist regarded Böhm with rather doubtful looks, and the latter had no sooner left the room than he turned to his Mæcenas and said, "Do you really mean it?" "Don't be alarmed," interrupted the manufacturer, "you will enjoy his acquaintance very much."

At last Böhm left his employer, who, together with his family, had become his friend; gave concerts in various parts of Switzerland, went from Geneva to Strassburg, and returned after numerous adventures, in which his prowess and bodily strength had saved his life, back to Munich, laden with glory and gold.

FLAUTIST IN THE COURT ORCHESTRA, 1818.

PETER WINTER.

On the death of the old Court flautist Becke, Böhm was appointed in the room of the deceased, on June 1st, 1818, with a yearly salary of 350 florins (600 marks). In that capacity he was placed under the composer and conductor of world-wide celebrity, Peter Winter, who admired not only Böhm's flute-playing, but more especially his reading and phrasing, the real *musical* interpretation which Winter rightly declared to be the very crown of all musical virtuosity. At the same time Winter understood how to avail himself of the mechanical genius of Böhm. Winter, when not at work at his writing-desk, was like a thoroughly naughty child. He used to amuse himself, for instance, for a large portion of his leisure time, with a representation in figures of the life of Christ, commencing with His birth. Winter spent a good deal of his fortune on that toy. Böhm was obliged to make swords for Winter's "three holy kings," and also carriages and harness; in return for which Winter promised Böhm to teach him composition, and to compose a concerto for the flute for Böhm's use. However, what Winter could

teach Böhm the latter had already learnt from practice; and after having spent whole nights on Winter's toys he never got the promised concerto, which Winter soon forgot. Böhm who had already tried his hand at composing, now began to study composition seriously under the celebrated teacher of counterpoint Joseph Graz, who enjoyed in Bavaria the same reputation that Albrechtsberger did in Vienna. He who wanted to pass for a solid and genuine composer had to go through the schooling of Graz. For economy's sake Böhm took his lessons of Graz at the same time as three other pupils; but Böhm was so far in advance of the others that the good-natured Graz resolved to teach him for nothing, and during an hour specially reserved for him. In the art of scoring for orchestra he was instructed by his friend, the future Court-orchestra conductor Stunz, who had just returned from Italy, and was appointed conductor in the place of Winter.

Soon after that, Böhm's first composition, a concerto in G major, was published, 1822, by the music publisher Aibl, who was also Böhm's pupil.

During his vacations Böhm frequently visited Switzerland, where he was always received with open arms. An English lord who took a fancy to Böhm and his art, proposed to him to accompany him and his family on a trip through Italy. Böhm could charge anything he liked, the only condition being that he would now and then play on the flute with the nobleman. The proposal was, of course, very tempting, and Böhm was anxious to accept it. However, the news of his father's illness called him back to Munich. His father died and he was compelled to carry on the jewellery business on behalf of his mother and sister. Before this, in the year 1819, Böhm had received various invitations to take the post of flautist abroad, and finally he told the director of the Court theatre, Baron von Rümpling, that he could not live on his small salary, and unless

it were increased, he would be obliged to accept a foreign appointment. The director was in a great predicament and brought the matter before King Max, and the King, who would not part with Böhm under any circumstances, added 250 florins out of his own private income, thus raising Böhm's salary to 600 florins (November 20th, 1820).

By that time Böhm ranked amongst the favourite virtuosi of Munich. In the fourth of a series of subscription concerts at Munich, on December 2nd, 1820, he played his G major concerto for the first time, with boundless applause. On a tour through Augsburg, Nuremberg, Leipsic, Dresden, Prague, &c., to Vienna, he was, November 14th, 1821, received with great approval in the last named city. (The 'Allg. Mus. Zeitung,' 24th year, 1822, p. 59, says: "We had also opportunity of appreciating the Royal Bavarian Court musician Böhm, as an excellent virtuoso on the flute.")

Such success caused, in 1822, a further increase of 100 florins in Böhm's salary, and now he considered himself rich enough to give up working as a goldsmith, and to devote himself entirely to music.

BÖHM AND MOLIQUE. CONCERT-TOURS.

Böhm became associated with a genius of a similar nature to his own, the violinist Bernhard Molique. King Max took this highly gifted boy when thirteen years of age under his protection, and had him taught by Pietro Rovelli, a great violinist, and member of the Royal orchestra. Two years later Rovelli sent the boy to Vienna, where he was received with joy. Rovelli never found himself quite at his ease in the ungenial climate of Munich, and in 1820 left for his native city Bergamo. Young Molique was appointed first violinist in the room of Rovelli; he soon attached himself to Böhm with great fervour, although the two were quite

different in their mode of life, and only in unison in their aspirations for a common noble aim.

About the middle of the year 1822 Molique and Böhm went on a concert tour to the north of Germany. In December 1823 they were at Nuremberg. On the 5th of December, 1823, they gave a concert in the "Goldener Adler" Hall, and the good people of Nuremberg were treated by them to a second concert, on the 8th of the same month, at the Museum Hall. Everybody was enchanted with the two artists. Of Molique they wrote: "Mr. Molique appears as a perfect violinist, conversant with every description of phrasing; it is particularly his exquisite *Cantabile*, that surpasses everything that we have ever heard from great artists, save, perhaps, Spohr, Rovelli, and Mayseder. The difficulties he conquers are incredible, and the force of his playing carries his hearers away with a feeling of confidence in his safety and correctness. Böhm, on the other hand, appears differently as a flautist. The characteristic of his playing is a soft development of a mild elegiac sentiment, a beautiful romantic longing; his singing on his instrument springs from a profoundly sensitive breast. He is distinguished by the way he expresses all the shadings and *nuances*, and the sweet melancholy of his charming style (taking the latter adjective in the sense of the art-term used by Kant and Schelling), which give him a place among the foremost flautists of Europe. One fears to breathe, lest the beautiful blending of the tone, the spell of his music, should be interrupted. It was a feast, to listen alternatively to these two artists, each of whom excelled in a particular way; for anything excellent will not be obscured or dimmed by another excellence; one elevating the other. May the two artists be pleased to accept our thanks which we consider ourselves happy in expressing thus publicly." ("Correspondent von und für Deutschland," No. 249, December 15th, 1823.)

From a report in Berlin: "On the 31st of January, 1824, two Bavarian Court musicians gave an evening concert. Herr Bernhard Molique played the violin part of a quartett of Spohr, and a *Potpourri* of the same composer; and Herr Theobald Böhm played a *Divertimento* for flute, of his own composition, and also variations by Drouet. Both were much applauded."

A report from the same capital, dated February, says: "Herr Molique and Herr Böhm, the Royal Bavarian court musicians, of whom we have already spoken with much pleasure, gave a concert on the 20th, at which the first-named artist played a violin concerto in E minor by Spohr; the latter a concertino for flute by Drouet; on the 29th Herr Molique played a fantasia of his own composition, Herr Böhm a concertino. Molique displayed pure intonation, a grand tone, great technique, a fine bow, and much precision in *legato* and *staccato* passages; Böhm excelled in a full tone, in tender delivery and technique, especially in doubles." ('Allg. Mus. Zeitung,' 26th year, 1824, pp. 109 and 170). The Leipsic criticisms, dated January 13th, are still more elaborate. (Ibid., p. 206.) Molique is especially praised for his soft and fine, frequently surprisingly beautiful delivery. "The concerto for flute by M. Böhm, played by the composer, although not of the highest order, and here and there too much of an imitation of Spohr's composition, yet takes an honourable place among the works of that kind. Herr Böhm's playing, too, is solid, that is to say pure and clever, with a beautiful, soft, yet full tone, and in the very difficult task of Drouet's variations he acquitted himself so creditably and with so much good taste, that we owed the artists a highly enjoyable evening."

In the year 1824 we meet with the two virtuosi again in Munich, when they gave together six evening concerts. In a report it is said: "We again heard Herr Böhm, after the lapse of some time, in a concerto for the flute

of his own composition. The Ritornello of the first Allegro movement is somewhat trivial; the Allegro movement itself, however, is exceedingly brilliant, and the playing was excellent. An Adagio in B flat major, in which a modulation in D flat occurs, which, for an instrument like the flute, may be called venturesome, is conceived in a very fine style for this instrument, and the orchestration reminds one of Mozart's works. The artist played it with full fine tone, gracefully and feelingly, and with faultless purity of execution. The Rondo alla Polacca, immediately after the Adagio, is undoubtedly the best work of the master. Brilliant passages succeed each other without fatiguing the listener, and the cantabile parts interwoven in the former produce an agreeable change of colour. Herr Böhm proved to us that evening that a talent like his is in no need of borrowing from others, in order to stand out in its own greatness, and that there is, for the tone artist, something more solid and better than the mere champagne-intoxication brought about by Drouet. His playing was received with enthusiastic applause, and the modest artist had several recalls." ⁵ Molique concluded the evening with a concerto of his own composition. The reviewer says: "We have before had an opportunity of appreciating the excellent gift for composition in this very young man (he was then nineteen years old); to-day we were quite surprised at his concerto, which is proof of his ability to become a truly ingenious ⁶

⁵ How strangely do critics differ! To the Munich writer Boehm appears to be a "tone artist," whilst Mr. Rockstro records his impressions of his playing as follows:—"He (Boehm) was good enough to play me a solo on it (his silver flute), but I must confess that I was grievously disappointed both with the instrument and the performance, the tone that he produced being extremely 'loose' and impure, especially in the lowest octave."—*Treatise on the Flute*, p. 617.—C. W.

⁶ Molique's Concerto for the flute, Op. 69 (Ashdown), is dedicated to "his friend, Theobald Boehm." Molique has arranged the

composer." ('Die Grazien. Blätter aus Bayern, zum Nutzen und Vergnügen,' Thursday, December 23rd, 1824, p. 305.)

BÖHM'S PLAYING. BÖHM WITH CATALANI.

These criticisms have so fully grasped the essence of Böhm as a virtuoso and composer, that we can accept them with full conviction now, 58 years later, Böhm having left the scene for ever. The peculiarity of Böhm, one in which he stands unsurpassed, was the charm, the soul of his phrasing. Böhm studied singing with an excellent Italian singer. He would sometimes practise for days the interpretation of a musical phrase, until his *maestro* would say, "Well, that *is* singing." Before commencing the study of a composition, for instance by Drouet, or before putting his own ideas into musical form, he studied or organised carefully the arrangement of the several musical phrases, in order to seize completely the sense of the composer, or to give his own composition the best shape. The very fact that he thoroughly assimilated the compositions he played gave him an enormous advantage over all virtuosi of the flute; and thus it is easily explicable, that an English lady once exclaimed: "I do not know how it is, but when Böhm plays a well-known composition, it sounds quite different from what any one else can make of it." Of all melodies Böhm preferred those with words, and in analysing

orchestral parts for the P.F. *à quatre mains*. The Andante of the Concerto, in the key of F, can be had separately with a pianoforte accompaniment for two or four hands. There is also published an Andante in G, which was originally written for this Concerto. In addition to this Concerto, Molique has composed a quintett for flute and strings, Op. 35 (Rudall, Carte & Co.), as well as an Introduction, Andante and Polonaise, Op. 43, for flute and P.F. (Rudall, Carte & Co.); also a duett, Op. 2, for flute and violin (Ashdown).

musical phrases, he tried to think of words for them. This reminds us of the words of Paganini to Professor Schlett at Munich. Being asked how he had arrived at such original interpretation, he answered: "I try to make my violin speak, leaving the rest to myself." ('Allg. Mus. Zeitung,' 32nd year, 1830, p. 70.)

An interesting triumph was scored by Böhm on November 11th, 1826. The celebrated Angelica Catalani visited Munich for the second time, with a view of giving two concerts. Between her first visit and the second there was an interval of ten years. In the year 1826 she was a woman of 43 or 47 years of age, and her heyday was of course over. On November 26th she gave her first concert. The intervals requisite for the repose of the great singer were filled up by the violoncellist Sigl, our Böhm, and the singer Krieninger. Sigl played in the first part of the concert, and Böhm commenced in the second with his variations, calling forth an enthusiasm so intense, that it threw into shade the applause given to the great Catalani. At the end of the concert Catalani was called for, but the storm of applause was allotted to Böhm. The correspondent of the 'Allg. Mus. Zeitung,' M. Schlett, instead of giving a true report of the concert, hushes up the facts, mentioning only that the second part of the concert was commenced by M. Böhm with "fancy variations."

For the second concert that Madame Catalani wanted to give, Böhm was likewise to play; but the judicious singer could not, after Böhm's success, be prevailed upon to let him have a share in the concert, and inferior musicians were picked out by her. The concert was given for the benefit of the poor of Munich; the house was crammed; the applause, however, was meant rather for the great name of the singer than for her actual performance. Madame Catalani, at that time, had already begun to sing out of tune. However, the correspondent calls her nevertheless "a very instructive

pattern of high, noble singing. Years," he says, "cannot quite do away what has been created in the serious Italian school; a school which at present has nearly disappeared."

In that year Böhm received a Royal intimation, that of the annual 250 florins only 50 would be considered as emolument, the remaining 200 being counted as part of his regular salary. His salary thus amounted to 700 florins.

After that concert Böhm repaired to his beloved Switzerland, and gave a concert in Zurich, November 22nd, being much applauded by his hearers. ('Allg. Mus. Zeitung,' 1826, p. 397.) He played his own compositions, and also variations by Drouet. From Zurich he made various trips to other Swiss towns, was everywhere received with the greatest applause, making dear friends, who never forgot him to the end of his life. Amongst other places he went to the small town of Morges ('Allg. Mus. Zeitung,' 1827, p. 362), or Morsee in German, a town in the Canton Waadt, west of Lausanne, on the Lake of Geneva. It is a commercial place, the people of which care very little for art. However, A. Späth, formerly member of the orchestra of Coburg, succeeded in uniting a number of music-loving people into a society, which, commencing with playing quartets, grew to a complete orchestra, consisting of fifty-eight members. Böhm accepted the friendly invitation extended to him by Späth, and gave three "winter concerts." At Vevey he saved his life when attacked by some drunken Savoyards, by a bold leap over a pile of beams five feet high.

At Geneva the "Société de Musique" elected him a member on February 20th, 1827, "jaloux de posséder au nombre de ses membres un Professeur aussi distingué" (anxious to have amongst their members so distinguished a professor).

BÖHM ESTABLISHES A FACTORY FOR THE MANUFACTURE OF FLUTES. PAGANINI.

Böhm's financial position as Court musician was, as we have already seen, not very splendid, especially considering the rapid growth of his family. The necessary means were found by giving concerts and lessons, and by the sale of his flutes, which he had made by the instrument-makers of Munich under his superintendence. The work of these handicraftsmen, however, who were not used to consummate mechanical precision, did not satisfy Böhm, and he made up his mind, in 1828, to found a factory of his own. There he found ample opportunity for the full development of his genius.

At the beginning of 1828 Böhm went again to Vienna, to procure suitable wood, &c., for his new factory, and to acquaint himself with the state of music in Vienna. Böhm played there his Opus 3, *Andante* and *Polonaise* in A major, which the publisher Diabelli forthwith accepted for publication. Böhm found Vienna what he had seen it seven years before, the old, easy-going, merry-making town. The celebrated firm, Haslinger, publishers of musical composition, were then building a splendid house, and Böhm remarked jokingly, "There you have the fruits of classical music!" The publisher answered, "Far from it—look here, *there* are the compositions that enable me to build my house!"—pointing to piles of dance-music by Strauss and Lanner.

About that time Nicolo Paganini, the greatest violinist of all time, was exciting to ecstasy the music-loving Viennese (he had just given his twelfth concert); and the enthusiasm for his art had reached such a pitch, that Mayseder, one of the pets of Vienna, took great offence at it, swearing never to play there again. Mayseder, as well as the majority of his colleagues, were quite sure that Paganini was only a charlatan—just because he was

so immeasurably above them. Böhm was so transported with Paganini's playing that he tried to get him over to Munich. Haslinger presented Böhm to the great violinist. Paganini was lying on a sofa, wrapped up in rugs, like a corpse. On Haslinger's explaining to him the object of Böhm's call, Paganini said in a feeble voice, "Munich is only a poor city, it is not worth while to go there." Böhm, who was an intimate friend of the then director of the theatre in Munich, Baron von Poissl, replied, "I guarantee you three concerts at our Court theatre, and you will see that the house will be crammed at the fourth." A year later, in November 1829, Paganini came to Munich, and Böhm's promise was redeemed twofold ('Allg. Mus. Zeitung,' 1830, p. 71).

On August 16th, Böhm left Vienna, travelling by way of Trieste, Padua, and Verona to Venice, where he arrived on the 18th. At Venice he played his Concerto op. 3, an Andante and Polonaise, with interminable applause. Towards the end of August he returned to his factory at Munich.

DEFECTIVE MECHANISM OF THE THEN EXISTING FLUTES.

Böhm's chief object was henceforth the production of a musically perfect flute. In his capacity as an artist he had had plenty of opportunities of finding out the imperfections of an instrument otherwise so charming, and he resolved to remedy its defects one by one. On the flute, for every note of the chromatic scale a side hole ought to be bored, since the air-column of the flute must be shortened for every higher note, in order that a pure scale may be obtained. For the production of the chromatic scale on the flute, beginning from *c* up to $\overset{=}{\underset{=}{b}}$, fourteen holes of that kind would be necessary. The player, however, has only nine fingers at his disposal, the thumb of the right hand that supports the flute, not being

available, although it has been attempted, for any rapid movement. There is therefore no other means than the discovery of a mechanism that would enable the nine available fingers to have a command over the other five holes of the flute. As a means of shutting the holes, so-called *keys*, that is, round metal cones covered with chamois leather, fixed at the end of a double-armed lever, and pressed down on the holes by means of a spring, are used.

From the first French D sharp key onwards, key after key was applied to the flute, in order to answer the requirements of players, and finally the flute had seventeen sound-holes, and eleven keys, together with four special levers. The keys kept certain holes shut, as long as they were not lifted up by the pressure of the fingers. The key consisted of a double-armed lever, widening out to a plate at the end, covered with soft leather, shutting the hole as long as the player did not bear on the other end of the lever, thereby raising the key. The double-armed lever had of course to turn in the middle on an axis. The frame for the D sharp key, which carried the fulcrum of the key, was at first like two cheeks, made of the wood of the flute itself, a brass wire being put as a fulcrum through the centre of the lever and the two wooden cheeks. A brass spring underneath that end of the arm of the lever which was pressed down by the finger, forced the end of the lever upwards, shutting thereby the key-hole. In lieu of the frames made of the wood of the flute itself, frames made of rectangularly bent brass plates were also used as axle-frames.

BÖHM'S IMPROVEMENTS: HIS FIRST FLUTE.

For this crude and rudimentary device Böhm substituted a key mechanism, which could only have been the work of a first-class mechanician. His skill as a goldsmith stood him in good stead. In lieu of the wood

cheeks or brass plates Böhm turned short columns⁷ of silver with small balls at the upper end to serve as axle-frames, the balls being perforated for the axles or so-called "corns," at the tips of which the axles turned. These columns were screwed into the wood of the flute at their bases by means of sharp screws, or soldered with their bases on the metal flute. A separate and very ingenious machine, invented by Böhm, secured that these columns were placed exactly in due relation to the axis of the flute, or precisely as the elongation of the radii of the cross-section of the flute. The "corns" and pivots of the axis are of steel. This alone makes the movements of the keys smooth and uniform, needing very little effort on the part of the player. The manufacturer is thus enabled to make the keys much less clumsy, thereby ensuring a perfect action in the most rapid movements.

This was the *first flute* manufactured in the workshop of Böhm, towards the end of 1828, and on which he played at his first performance in Paris. This flute was received with so much approval, that Böhm's factory could hardly furnish the number of flutes ordered.

The levers of the keys which controlled the low notes had to be made very long to come within reach of the fingers, and it thus became necessary to connect two two-armed levers; this occasioned the shutting of the

⁷ The contrivance here described is that with which we are so familiar as the French pillars. The Doctor, having first seen these pillars on Boehm's flute of 1828, came to the conclusion that they were the invention of Boehm, just as we have seen Coche attributing to Gordon the invention of the excavation to receive the lower lip, and Clinton the idea of open keys and equalised holes, they being under the belief that these inventions first appeared on Gordon's flute. Boehm does not claim to have invented the French pillars. What he says is that in 1828 he began to construct "various machines" (the words in the manuscript are "mechanical means") for making them. See his *Essay on the Construction of Flutes*, p. 12. In the French translation the words are "des outils spéciaux et des machines auxiliaires."

sound-hole by pressure on the key, just as pressure on the end of the ordinary and simple keys caused the sound-hole to be opened. On an old flute thus rendered more perfect there were some keys placed lengthwise and others crosswise. The flutes looked as if young leeches had taken hold of them. One key would move easily, another with much difficulty, in short, the mechanism of the old flute previous to Böhm was the result of the necessity of boring more and more holes into the flute in addition to the six holes of the diatonic scale, the greater development of instrumental music requiring more and more chromatic notes. These side-holes had, moreover, to come within reach of the six fingers by means of keys and levers. The way in which Böhm replaced this crude mechanism by a rationally arranged system of key-mechanism will be seen in treating of his *second* flute, based on acoustic principles.

BÖHM'S CONNECTION WITH PROFESSOR VON SCHAFHÄUTL. ACOUSTIC IDEAS OF THE LATTER.

At the end of 1827 an appointment in the library of the University brought me to Munich. In my younger days it was customary to teach children music, and in the Catholic institutions the pupils formed an orchestra of their own which played in church on solemn occasions. I was therefore well acquainted with music, and had paid much attention to the construction of musical instruments, especially of the organ. It was the love of music that attracted me to Munich; music, although I could consider it only as a side-issue, filling my whole heart. Böhm's new flute and his flute-factory greatly interested me. I therefore made his acquaintance at once, and was his friend for fifty-four years from that time. We exchanged our ideas more especially on the subject of the scientific construction of pianofortes on which I had been meditating for some time, sketching

out my plans and views. The nature of musical tone had also occupied me from my youth upwards. The general and rapid development of the mathematical laws of motion had matured the view that musical tone, too, consists only of transverse and longitudinal oscillations of acoustical bodies. Thus the string, which, if stretched over a non-elastic support, is hardly audible, was considered the sounding body ; and the elastic support, for instance the body of an Amati or Stradivari violin, is considered to the present moment as serving merely to swell the tone of the string.

Deaf persons can be made to hear the playing of a pianoforte by connecting their frontal bones with the sounding-board of the piano by means of a firwood-rod ; they will thus hear not only the notes, but the whole of the harmonies of the person who plays. This fact, however, cannot be accounted for by the assumption of an impact of waves which, starting from the sounding-board, proceeds from molecule to molecule into the frontal bone of the deaf person.⁸

⁸ The peculiar affection of the organ of hearing here alluded to, in which sounds, which cannot be heard through the passage leading from the outer ear, are rendered audible in the way described, is known as middle ear deafness. It is comparatively uncommon, the proportion of cases amongst the deaf being only five per cent. For its alleviation an ingenious instrument, called the audiphone, has been devised. It consists of a thin plate of ebonite, which, when in use, is slightly bent, so as to be put into a state of tension. The deaf man holds one end of the plate between his teeth ; the voice of the person who is addressing him throws the plate into vibration, and the vibrations thus generated are communicated through the teeth to the bones of the skull.

Strange to say, those who suffer from this form of deafness can hear better when they are in an atmosphere of sound, such as the rattling of a railway carriage, or the roar of the traffic of a great thoroughfare. Readers of Dr. Burney's *History of Music* will recollect that it is related, amongst the marvellous effects ascribed by the ancients to music in the treatment of disease, that Asclepiades cured deafness by the sound of the trumpet. This is too much for Burney. "Wonderful, indeed," he exclaims, "that the

Exactly at the time of Böhm's departure from hence for London, fifty-one years ago, I published, in Poggen-dorff's 'Annalen der Physik' (1831), my ideas on the Æolian harp, stating, that the sounding body in the case of the violin is the sounding board, the vibrating string being the energy of a tone determined by the tension of the string. In a subsequent essay, "Correction of a Fundamental Theorem in Acoustics" ('Neues Jahrbuch für Chemie und Physik,' vol. vii., 1833) I enlarged my views, instancing the strings of a pianoforte, stretched on one side of a wall and, by means of firwood-rods, conducting the tone through the wall to a sounding board in another room, &c. To-day my views, uttered half a century ago, have been confirmed by the telephone and microphone. Since November 1881, the palace of the Crown Prince is connected with the Royal Opera House by microphone wires. Every note sung by the singers can be heard with the greatest distinctness in the apartments of the Crown Prince, nay, one can distinguish the persons singing.

BÖHM'S JOURNEY TO LONDON.

In January 1831, Böhm repaired to Paris, where he caused the greatest sensation with his playing, and his

same noise which would occasion deafness in some, should be a specific for it in others! It is making the viper cure her own bite." He endeavours to explain the statement by supposing that Asclepiades was the inventor of the ear-trumpet, or perhaps of the speaking-trumpet, "which," he adds, "is a cure for distant deafness." However, he goes on to give a modern instance, that of a lady who could only hear when a drum was beating, insomuch that her husband hired a drummer as her servant, in order to enjoy the pleasure of her conversation. But even the authority of the distinguished physician, Dr. Willis, who gives an account of the case, is not sufficient to convince the incredulous Burney. He thinks that such stories are only told to prove "that Greek noise could do nothing which the modern would not operate on as effectually."—C. W.

flute. From there he left for London, at the end of March. He was much admired at private concerts, and asked to play in public. Thus he was requested to play at the annual concert of the Choral Fund Society, which was given for the benefit of indigent musicians, or for the widows and children of musicians. Amongst the patrons of that concert, besides the Queen,⁹ and numerous Dukes and Duchesses, was Prince Leopold of Saxe-Coburg. The concert was of a mixed character, consisting of vocal music interspersed with instrumental compositions. The instrumental artists were Moscheles, the pianist; Böhm, who was mentioned on the programme as His Majesty the King of Bavaria's first flautist, and as appearing now for the first time in this country. The concert took place on April 15th, 1831, at Hanover Square.¹⁰ Böhm played his fantasia on a recitative and

⁹ The concert was given under the patronage of "Their most Gracious Majesties." Dr. Schafhäutl was nearly eighty years of age when he wrote the memoir of Boehm, and his sight was in a deplorable state, so that for "their Majesties" he appears to have read "her Majesty." To his mistake respecting the solo which Boehm was announced to play, a mistake which seems to be attributable to the same cause, I have already drawn attention (p. 362).

¹⁰ The Hanover Square Rooms, where the concert took place, were then styled "The King's Antient Concert Rooms," the Directors of the Concerts of Ancient Music having taken a lease of the premises. For a copy of the programmes here given of this and some of the other concerts at which Boehm played, I am indebted to Herr Ludwig Boehm.—C. W.

PART I.

Overture (Esther)	<i>Handel</i>
Solo, Miss BRUCE, and Chorus, "O the pleasures of the plains!" (Acis and Galatea)	<i>Handel</i>
Song, Mr. PARRY, jun., "Honour and arms" (Samson)	<i>Handel</i>
Recitativo ed Aria, Miss BRUCE, "Della Tromba"	<i>Pucitta</i>
Fantasia, Flutè, Mr. BOEHM (Principal Flute to the King of Bavaria—his first public performance in this country)	
Duet, Madame STOCKHAUSEN and Mr. BRAHAM, "Cher intesi"	<i>Mayer</i>
Scena, Miss HUGHES, "Softly sighs the voice of evening" (Der Freyschutz)	<i>Weber</i>

aria of Pucitta amidst colossal applause; his brilliant delivery and feeling *adagio* were especially admired. A storm of applause followed the grand scene and air from 'Freischütz': 'Wie nahte mir der Schlummer,' sung by Miss Hughes, celebrated for her magnificent voice. The drinking song by Marschner: 'Im Herbst, da muss man trinken,' which was announced as a 'Bacchanalian song," and sung in German by Mr. Phillips, excited also great enthusiasm. In the second part of the concert Moscheles played the grand fantasia with orchestral accompaniment, called 'The Strains of the Scottish Bards,' a work of his own composition. On Friday, April

Scena, Mr. Sinclair, "Fra un istante"	<i>Rossini</i>
Glee, Miss BRUCE, Mr. TERRAIL, Mr. VAUGHAN and Mr. BELLAMY, "The red, red rose"	<i>Knyvett</i>
Song, Miss CRAMER, "Gratias agimus tibi," accompanied on the Clarinet by Mr. WILLIAM	<i>Guglielmi</i>
Song, Mr. BRAHAM, "The Rover's Bride," accompanied by himself on the Pianoforte.	<i>A. Lee</i>
Bacchanalian Song, Mr. PHILLIPS, "Im Herbst, da muss Man trinken"	<i>Marschner</i>
Recitative and Air, Madame STOCKHAUSEN, "With verdure clad" (Creation).	<i>Haydn</i>
Grand Chorus, "Hallelujah" (Messiah).	<i>Handel</i>

PART II.

Grand Sinfonia.	
Chorus, "He gave them hailstones" (Israel in Egypt).	<i>Handel</i>
Aria, Miss FANNY AYTON, "La Biondina"; with variations by	<i>Paer</i>
Recitative and Air, Mr. BENNETT, "O Liberty," accompanied on the Violoncello by Mr. LINDLEY (Judas Maccabeus)	<i>Handel</i>
Duet, Miss HUGHES and Mr. PHILLIPS, "Crudel, perché finora" (Figaro)	<i>Mozart</i>
Swiss Air (by desire), Madame STOCKHAUSEN, "The Harvest Home," accompanied on the Harp by Mr. STOCKHAUSEN	<i>Stockhausen</i>
Song, Mr. SINCLAIR, "The spring time"	<i>Sinclair</i>
Grand Fantasia, Mr. MOSCHELES, "The Strains of the Scottish Bards," with Orchestral Accompaniments.	<i>Moscheles</i>
Glee, Miss Hughes, Mr. TERRAIL, Mr. VAUGHAN, and Mr. BELLAMY, "The rose of the valley"	<i>Knyvett</i>
Song, Miss BRUCE, "The Soldier's Tear"	<i>A. Lee</i>
Terzettino (by particular desire), Miss HUGHES, Mr. SINCLAIR and Mr. PHILLIPS, "Vadasi via di quà"	<i>Martini</i>
Grand Chorus, "God save the King"	<i>Handel</i>

15th, 1831, Böhm played at a morning concert,¹¹ "for the benefit of an author," his *divertissement* for the flute. Among the other artists in that concert were Santini, de Begnis, Madame Marie Lalande, the blind violinist A. Tolbeque, a pupil of R. Creuzer, and Madame Dulken.

On the 31st of May, Madame Dulken gave her grand *matinée*, under the patronage of the Duchess of Kent. The concert was rendered quite extraordinary by the co-operation of Madame Pasta, the greatest singer of her time, and perhaps of all times; of Rubini, the greatest tenor of this century; and of Lablache, the greatest and most marvellous basso of the age, who sang twice, once

¹¹ KING'S THEATRE, CONCERT ROOMS.

Au Bénéfice d'un Homme de Lettres.

MORNING CONCERT.

Friday, April 15, 1831.

PART I.

Fantaisie en trio, sur un Air Espagnol, Piano, Oboe, and Bassoon, Mr. . . . , M.M. BARRET and BAUMANN	<i>Brod</i>
Cavatina, Melle. DU PUY, Quando o Core	<i>Pacini</i>
Duetto, Con pazienza, Mme. MERIC LALANDE and Signor DE BEGNIS	<i>Mayr</i>
Divertissement sur la Flute, Mr. THEOBALD BOHM	<i>Bohm</i>
Duo, Signori SANTINI and DE BEGNIS	
Duo, Signori CURIONI and DELLA TORRE, Ail' Idea	<i>Rossini</i>
Cavatina, Miss FANNY AYTON, The Deep, Deep Sea	<i>Horn</i>
Air, Signor DE BEGNIS, Le Fifre (words by Mr. Mars)	<i>Donnadieu</i>
Fantasia, Piano Forte, Mme. DULCKEN	<i>Moscheles</i>
"On one of Erard's patent action Grand Piano-fortes."	

PART II.

Variations sur l'air de Céline, Bassoon, Mr. BAUMAN	<i>Berr</i>
Comic Trio, Mme. MERIC LALANDE, Signori CURIONI and DE BEGNIS, Vadasi via di quà	<i>Martini</i>
Duetto, Miss FANNY AYTON and Signor SANTINI, Dun- què io son	<i>Rossini</i>
Air varié, Violon, Mr. A. TOLBECQUE	<i>A. Tolbecque</i>
Aria, Signor DELLA TORRE, Udite	<i>Cimarosa</i>
Fantaisie, Violoncello, Mr. ROUSSELOT	<i>Rousselot</i>
Romance, Melle. DU PUY, le Bonheur de se revoir	<i>Amédée de Beauplan</i>

in a trio of Mozart, and the other time in a duo of Cimarosa.¹²

Böhm opened the second part with a fantasia. His brilliant delivery, his double tonguing, his feeling adagio,

¹² GREAT ROOM, KING'S THEATRE.

Under the immediate patronage of Her Royal Highness the Duchess of Kent,

MADAME DULCKEN

Respectfully announces to the Nobility, Gentry, her Friends, and the Public in general, that her

MORNING CONCERT

will take place at the above rooms on Monday, May the 23rd, 1831.

PART I.

Overture (Oberon)	<i>Weber</i>
Trio, Miss MASSON, Monsieur BEGREZ, and Signor LABLACHE	<i>Mozart</i>
Aria, "Risplendi o suoi beato," Signor RUBINI	<i>Raimonda</i>
Duo, "Se fiato in corpo avete," Signor LABLACHE and Signor DE BEGNIS	<i>Cimarosa</i>
Duo, "Mille sospiri e lagrime," Miss MASSON and Madame PASTA	<i>Rossini</i>
Concerto in A flat, Pianoforte, Madame DULCKEN	<i>Hummel</i>
Aria, "I tuoi frequenti palpiti," Madame PASTA	<i>Pacini</i>
Fantasia, Horn, Signor PUZZI	<i>Puzzi</i>

PART II.

Fantasia, Flute, Mr. BOEHM	<i>Boehm</i>
Duo, "D'un bel uso," Signor SANTINI and Signor DE BEGNIS	<i>Rossini</i>
Fantasia, Harp, Monsieur LABARRE	<i>Labarre</i>
Duo, Signor RUBINI and Madame PASTA (Medea)	<i>Mayer</i>
Brilliant Variations on Weber's Hunting Chorus (Eury-anthe), Pianoforte, Madame DULCKEN	<i>Czerny</i>
Trio, "Vadasi via di quà," Miss MASSON, Monsieur BEGREZ, and Signor DE BEGNIS	<i>Martini</i>

The Band will be numerous, and consist of the most eminent Performers.

Leader, Mr. MORI.

Conductor, Signor COSTA.

Tickets, Half-a-Guinea Each,

To be had of the principal Music Sellers; and of Madame DULCKEN, 17, Howland Street, Fitzroy Square, to whom Applications for Boxes are requested to be made.

The Concert will commence at Two o'Clock precisely.

called forth enormous applause ; however, an English critic said : " As to volume of tone our Nicholson stands unsurpassed."

In another *matinée*¹³ on Saturday, May 28th, Böhm played a solo for the flute. Besides Santini and de Begnis, the violinist A. Tolbeque also took part.

On May 3rd Moscheles gave his great concert at the King's Theatre. The bill announcing it was 63½ centimetres wide, and 1 metre high. Böhm played in the second part a fantasia on the Bavarian national air :

¹³ ARGYLL ROOMS, REGENT STREET.

MORNING CONCERT.

Saturday, May 28, 1831.

PART I.

Overture	
Duetto, Signor TORRI and Signor SANTINI, "Ché bella vita"	<i>Generali</i>
Solo, Flute, Mr. BOEHM	<i>Boehm</i>
Aria, Mademoiselle DU PUY	<i>Mercadante</i>
Duetto, Miss DUNN and Miss M. DUNN, "I know a bank"	<i>Horn</i>
Duetto, Madame STOCKHAUSEN and Signor DE BEGNIS, "Nella casa"	<i>Generali</i>
Solo, Harp, Mr. Davies	<i>Bohsa</i>
Ballad, Miss DUNN, "Rest, warrior, rest"	
Duetto, Signor DE BEGNIS and Signor SANTINI, "No donne mie non v'è"	<i>Morandi</i>
Terzetto, Madame STOCKHAUSEN, Signor TORRI, and Signor DE BEGNIS, "Vadasi via di quà." Altered from Martini by Signor De Begnis.	

Between the Parts,
The Musical Imitations of
DER BAYRISCHE TONKUNSTLER.

PART II.

Fantasia, Pianoforte, by an Amateur	<i>Moscheles</i>
New Rondo, Signor DE BEGNIS, "Je suis le petit tambour." Arranged by Signor De Begnis.	
Solo, Violoncello, Monsieur ROUSSELOT	<i>Rousselot</i>
Duetto, Mademoiselle DU PUY and Signor VERCELLINI, "Ah se de mali miei"	<i>Rossini</i>
Swiss Song, Madame STOCKHAUSEN ; accompanied on the Harp by Mr. STOCKHAUSEN	<i>Stockhausen</i>
Solo, Violin, Monsieur TOLBECQUE	<i>Tolbecque</i>
Aria, Miss M. DUNN, "Il braccio mio conquise"	<i>Nicolini</i>
Finale, Overture	<i>Mozart</i>

“Du, du liegst mir im Herzen.” Nearly all the celebrated artists then in London appeared at that concert, amongst others the tenor Rubini. First he sang an aria by Costa, then a duet with de Begnis, named, “Fin che el mar.” Moscheles played as his second piece a grand fantasia, “Recollections of Denmark,” with orchestra, and also a trio, both of which he had composed specially for that concert. The celebrated violinist, F. Cramer, played too, and also Lindley, the greatest violoncellist of his time, whose tone has never been surpassed in fulness and beauty. “At the request of the public,” Moscheles played his “Fantasia concertante,” for voice, harp, horn, and pianoforte, on a Romanza of Blangini. The concert was brought to a close by Moscheles, who played an improvisation on a theme given him by one of the audience.¹⁴

¹⁴ KING'S CONCERT ROOM, KING'S THEATRE.

Mr. MOSCHELES

Respectfully informs the Nobility, Gentry, and his Friends in general,
that his

MORNING CONCERT

will take place at the above Rooms on Tuesday, May 3rd, 1831.

PART I.

Overture (Oberon)	<i>Weber</i>
Duetto, Signor SANTINI and Signor DE BEGNIS, “No donne mie non v'è”	<i>Morandi</i>
THE RECOLLECTIONS OF DENMARK,	
A Grand Fantasia, with Orchestral Accompaniments (second time of performance), Pianoforte, Mr. MOSCHELES	<i>Moscheles</i>
Duetto, Madame PUZZI and Miss MASSON, “Serbami ognor” (Semiramide).	<i>Rossini</i>
Scena ed Aria, Signor RUBINI	<i>Costa</i>
Fantaisie à la Tirolienne, French Horn, Mr. PUZZI.	

A NEW GRAND TRIO CONCERTANTE,

Composed expressly for this occasion. Pianoforte, Violin and Violoncello, Messrs. MOSCHELES, F. CRAMER and LINDLEY	<i>Moscheles</i>
Grand Scena (MS.), Miss INVERARITY (composed ex- pressly for this occasion).	<i>Murray</i>

THE ENGLISH FLAUTIST NICHOLSON AND HIS
INSTRUMENT.

Every one was struck with the purity of Böhm's flute in all the scales, and particular interest was taken in him and his flute by Messrs. Rudall and Rose, the largest and oldest firm for manufacturing wind instruments in London; George Rudall himself being an excellent flute-player. Amongst other flutes, those of Nicholson were also made by the said firm.¹⁵ Through Rudall, Böhm made the acquaintance of the amiable

PART II.

(By particular desire) the Fantasia Concertante on a favourite Romance by Blangini, for Voice, Harp, Horn, and Pianoforte, Madame PUZZI, Miss E. BISSET, Messrs. PUZZI and MOSCHELES *Moscheles*

Duetto, Signor RUBINI and Signor DE BEGNIS, "Fin che al mar" *De Begnis*

Ballad, Miss CRAMER, "The Soldier's Tear" *A. Lee*

Fantasia on a Bavarian Air, Flute, Mr. BOHM (Principal Flute to the King of Bavaria) *Böhm*

Aria, Miss MASSON, "Se m' abbandoni" (Nitocri) *Mercadante*

NAPOLEON'S MIDNIGHT REVIEW,
A new MS. Cantata, Mr. PARRY, jun. (first time of performance) *Neukomm*

Extemporaneous Performance

On the Pianoforte by Mr. MOSCHELES, on which occasion he requests any of the Company to give him a written Theme to perform on.

Leader of the Band, Mr. F. Cramer.

Conductor, Sir George Smart.

The Concert to begin at Two o'clock precisely.

Tickets, 10s. 6d. each, to be had of Mr. Moscheles, No. 3 Chester Place, Regent's Park; at the Box Office of the King's Theatre; and at the principal Music Shops.

An early application for Boxes is requested to be made to Mr. Moscheles.

¹⁵ The Doctor is mistaken. Nicholson's flutes were made by Clementi & Co.

Charles Nicholson¹⁶ and his flute. The Nicholson flute was the ordinary one; but the tall and vigorous Englishman, led by a true instinct, had the holes so increased in size as to suit his large and powerful fingers. Nicholson was the greatest English flute-player—his tone surpassed in fulness and force that of all other flautists of his time, and that is a quality which responds well to the character of the English people. The English love in all musical instruments a full, powerful tone; in contrast to the French, as may be seen in the pianos of the two nations. Moreover, his *adagio* was characterised by a peculiar vibrato in sustained notes, something like the fine tremolo in singing.

The extraordinary, the previously unheard of force of Nicholson's tone riveted Böhm's entire attention, and set him a-thinking on the nature of the musical tone, inducing him to make countless experiments and trials, out of which sprang his flutes up to the last—the silver flute, the most perfect of all wind instruments with keys.

GORDON'S EXPERIMENTS FOR THE IMPROVEMENT OF THE FLUTE.

In London, Böhm made the acquaintance of a Swiss of Lausanne, a dilettant on the flute (late pupil of Drouet), who had devoted all his energy and his fortune to the improvement of the ordinary flute and to the invention of a perfect instrument. His name was W. Gordon; he had been one of King Charles Xth's Lifeguards, and after the abdication of Charles X., he was, of course, pensioned. Gordon, too, had learned in England that the enlargement of the hole enlarges

¹⁶ In 1836 important musical engagements held by Nicholson were placed at Boehm's disposal, but at that time he was still occupied with the iron industry. In after life he expressed the opinion that he ought not to have declined the offer. Nicholson lived until the close of the winter of 1836-7.—C. W.

the volume of the tone ; however, the notes produced by the enlarged holes were not in harmony with one another. Having no idea of the acoustical principle, according to which the holes are to be placed, he tried to find out the right places in an empirical way, that is, in the very way in which the place of all holes had been discovered up to this hour. The experiments were very expensive, nearly every experiment requiring a new model. When the finger-holes were too high the remedy was simple enough ; Gordon enlarged them until the note was correctly tuned. Thus, for instance, the finger-hole for \bar{z} was the largest of his finger-holes. When he wanted to make the finger-holes smaller he was obliged to fill them up, and this proved very difficult work and could only be done unsatisfactorily. However, all flutes were tuned in that manner. Every flute, even the very best, possesses holes of varying sizes. See, for instance, the holes and their respective places on the best English flute with eight keys, on the plate, Fig. 4.¹⁷

The models of Gordon were executed in London by the flute-maker, Cornelius Ward. The change in the place of the finger-holes made a change in the system of fingering necessary. Gordon communicated his ideas to his teacher Drouet and the flautist Tulou, who approved of his undertaking, but would not listen to changing the fingering. Gordon now had the unfortunate idea of making his new flute with the new arrangement of finger-holes playable by means of the old fingering. He also consulted Böhm about his project.

Böhm tried to explain to him that his method of

¹⁷ In a supplementary chapter to his *Life of Boehm*, Dr. Schafhäutl published the fingering of the Boehm flute, and some drawings and illustrations of Boehm's different instruments. It is one of these which is here referred to. A similar figure will be found in this work, p. 205.—C. W.

vague empirical experimenting would never lead to a real improvement¹⁸ of the flute; at the same time he told him that Nicholson had set him a-thinking, and that he meditated giving the flute a new form on a more rational basis. He took leave of Gordon, repeatedly assuring him that without a change of the present fingering the flute would never be equalised in tune. He also promised to apprise Gordon of his own experiments.

Böhm returned to Bavaria through Paris, and arrived at Munich in September 1832,¹⁹ covered with glory. In Munich his doings in Paris and London had been watched attentively, and thus it came to pass that the King increased his annual salary by 300 florins, so that his pay now amounted to 1200 florins, 680 of which were meant as pensionable salary, and 520 as payment for his services. This increase in his salary Böhm owed to his friend, the then director of the Court music, Baron de Poissl, who was also well known as a musician and composer of operas.

AN ENGLISH AMATEUR FLUTE-PLAYER. EXPERIENCES IN ENGLAND.

Böhm's public appearance in England forms the bright spot of his activity in this country. Through his flute-playing and his behaviour as a gentleman, on which latter the career of a foreigner in London chiefly depends, he got acquainted with a great number of the nobility and gentry, whose guest—and sometimes not

¹⁸ If we can rely on the evidence we have that the flute Gordon was endeavouring to get constructed in London was on the open-keyed system, this account of what passed between Boehm and Gordon can rest on no better foundation than does Mr. Rockstro's vision of Boehm engaged in leading Gordon "off the scent."—C. W.

¹⁹ 1831, not 1832, is, of course, meant.—C. W.

quite voluntarily—he used to be at their country seats. Among these were chiefly amateurs who played the flute, and others who had bought Böhm's patented flute in London.

One of the richest landowners of the South of England played a silver flute of Rudall's make, and was transported on Böhm's appearance at the Industrial Exhibition in London.²⁰ Böhm was obliged to go with him to the country. The artist was surrounded with princely splendour; he had a footman to himself. The adopted son of the Baronet was a real Nimrod, and thus the most beautiful horses and carriages of all sorts were at Böhm's disposal. The only thing Böhm was expected to do was to play duets with the Baronet in the evening, teaching him now and then how to set to work with the new flute. One afternoon the Baronet was practising a duet which they were to play the same evening. A certain passage, although the Baronet did his best to overcome it, proved too hard for him, and as is the case with passages that one wants to play particularly well, the more he practised the less he could play it. Finally the Baronet grew so fiercely angry that he flung the silver flute behind the door. There it was—a wreck. At this sight the wrath of the Baronet was soon toned down. Böhm was just entering the drawing room: "Böhm, let me have your flute—ask what you like for it. See what a fool I have been!" Böhm smiled, telling the footman to sweep together carefully all the pieces of the flute, and then to put them into a box and carry them to his room. Then Böhm asked: "Is there no watchmaker in the neighbourhood?" "Yes, in the little town of Horsham there is my watchmaker." "Well," said Böhm consolingly,

²⁰ The reader will observe that the Doctor has here jumped over a period of twenty years, from 1831 to 1851. In the interval, not only Boehm's first flute, that of 1832, but the cylinder of 1847 had been invented.—C. W.

“to-morrow evening we will play the duet.” The Baronet looked at him doubtingly. The next morning Böhm drove in a splendid carriage drawn by two horses to the watchmaker at Horsham. “I have here the fragments of your Baronet’s flute, will you allow me to put them together in your workshop?” The watchmaker readily consented, and was Böhm’s attentive spectator during the time he went on filing, soldering, polishing, placing the key supports in the right line, &c. After six hours’ work the flute was ready, and like new. Böhm thanked the watchmaker doubly; for, in working in his shop he discovered an excellent solder, with which he had not been previously acquainted, namely, the chloride of zinc, or as it is technically called, chlorzinc. The Baronet was enchanted with the new flute, which was again as beautiful as if it had just left the hands of Rudall. It responded even more easily than before. The Baronet tried everything to keep Böhm at his country seat; however, Böhm was obliged to go to London to the jury. The Baronet let him go after a promise to come back again soon. Böhm’s path, however, was different—he never saw the Baronet again, as was the case with so many of his English friends. During his stay in England Böhm had paid attention not only to flute-playing, but to the indescribably grand technical and commercial life of that insular nation, a life of which he had scarcely found a trace in other countries. The gigantic ironworks, the English cast-steel factories interested him all the more, because in his workshop he constantly needed English cast-steel for his screws, corns, and axles.

MECHANISM AND IMPERFECTION OF THE FLUTES OF THAT TIME.

Böhm had no sooner arrived at Munich,²¹ than he proceeded with an energy characteristic of him to carry

²¹ We now return to the year 1831.—C. W

into execution his plan, which was the total reconstruction of the flute and its key system. From the outset Böhm did not heed the position of the fingers, his chief aim being to so place the finger-holes that the whole chromatic scale might be played in the purity of tone required by theory. For all flutes made previous to the Böhm flute were founded on purely empirical experiments. The rational scale on the flute was to be arrived at on the same principle as that by which the organ-builders were enabled to produce the chromatic scale by means of pipes. It is, of course, well known, that each pipe sounds higher the shorter it is made. Thus the organ builders sharpen their organ-pipes by cutting them off at their upper rim until they are reduced to their proper height. If the organ is too sharp, the organ-builder is forced to glue or solder a piece to the pipe, until the pipe reaches the requisite length. The violinist likewise shortens his strings, if he wants to get higher notes, and the $\overset{=}{e}$ string, for instance, gives the octave, or $\overset{=}{e}$ by putting the finger about the middle of the string, and pressing on it, thereby shortening the string by one-half. It is almost the same thing with the pipes of the organ; the organ-builder needing eight for a diatonic octave, and thirteen for a chromatic. Should the flute-maker thus reduce the length of his flute by degrees, he would, after thirteen reductions, obtain the octave of the flute-pipe. In order, however, that he may obtain all the notes, of one octave for instance, by means of one and the same flute, without reducing it by successive shortenings, nature herself led the primitive performers on tubular instruments to the contrivance of cutting or boring a side-hole into the tube. This has the same effect as if the tube had been cut off. A further advantage of this side-hole is this, that one need but put one's finger on the hole, thereby closing it, in order to have the fundamental note of the flute. If we were to cut a side-hole for every note of the diatonic scale, eight holes would be necessary.

However, only six fingers were at the disposal of the player, and thus the seventh note, and, counting the octave, the eighth too, of the diatonic scale was not provided²² for, the thumb being occupied with holding the flute, and the little finger was useless for the German flute on account of its shortness. For this reason three holes for the right hand were bored at the bottom, and three holes for the left hand at the top, at equal distances, each of which would be easily reached and covered by the fingers. If the fundamental note of the flute was d , the second hole gave \bar{e} , the third f sharp, and \bar{f} natural next alone was wanting. The holes being placed in that way \bar{f} could be obtained only in an indirect and artificial manner; and this was the case with most of the notes of the chromatic scale. This peculiarity formed one of the chief defects of the old flute.

We have seen above that the side-hole acts as if the flute had been cut off; this, however, it does only partially, for the side-hole is too small to cause the entrance of a regular negative wave corresponding to the diameter of the flute. The tube of the flute could not therefore be considered as being entirely reduced by cutting it off, as was the side-pipe which gave $\bar{f}\sharp$, the air column beneath the $\bar{f}\sharp$ hole interfering even when the \bar{e} hole was open. If now the hole lying below $f\sharp$ and giving e be shut with the finger, the hole for $f\sharp$ being left open, the co-vibrating air column below the $f\sharp$ hole

²² The reader, if a flute-player, will not need to be reminded that the Doctor has for the moment overlooked the circumstance that the hole at the open end of the flute produces a note, so that we do not require seven finger holes, as he states, to make the seven notes of the diatonic scale, but only six. The seventh note, instead of being unprovided for, is produced by the hole covered by the first finger of the left hand. So, too, it would not be the second finger hole that would produce E and the third F# on a keyless flute in D, as he says farther on, but the first and second respectively.—C. W.

will depress the tone, and instead of $f\sharp$ the desired f will be obtained. It will, however, be a muffled tone of quite a different character. Those fingerings were called *fork-fingerings*, one hole being left open between two fingers closing two holes; and by means of these fork-fingerings one was able to produce the whole diatonic scale and its octave. The French added a hole for $d\sharp$ between \bar{d} and \bar{e} , which, however, had to be closed by a key, there being no finger to press upon it. Thus even the chromatic notes could be produced; they were, however, so different from the other notes of the scale, and some of them so false, that at best only two scales could be obtained that sounded quite in tune.

ATTEMPTS AT IMPROVEMENT.

The flautists, therefore, essayed, in keeping with the improved instrumental music of the time, to make the notes obtained by fork-fingerings as pure as were the others. They accordingly bored new holes alongside the holes of the diatonic scale, closing them, in default of fingers, with key-valves or keys, which were pressed down on the holes by springs. The end of the key had of course to be brought within reach of one of the six fingers.

The first key of that kind was applied by the French to a hole, bored between the first d hole and the e hole next above, and which gave the semitone $d\sharp$ between d and e .

This $d\sharp$ key was for a long time the only key on the flute. Its invention has been ascribed to the celebrated German flautist Quantz.²³ It was placed within reach of

²³ It is, of course, needless to repeat that the key which Quantz introduced was not that here ascribed to him (see *supra*, p. 229). Quantz endeavoured, but without success, to discover the origin of

the little finger. At last a step onwards was ventured on. The flute-makers added another key, the $g\sharp$ key, to the old $d\sharp$ key. The $g\sharp$ key was so placed as to be within reach of the little finger of the left hand; finally came the $\bar{b}\flat$ key, which was governed by the thumb of the left hand. Böhm commenced his studies on such a flute,²⁴ turned after the system of Grenser by Böhm himself. Thus it was that more and more keys were added to the old flute. The \bar{f} key was added, but for it there was no finger left. It was only by letting another finger slide from its hole on to the key that F was to be obtained.

The old D-flute with its six key-holes has always been kept as the basis, notes that could not be obtained from these holes being produced by means of side-holes, which had to be closed by keys, and thus the old D-flute had as many as fourteen keys. Finally, the lower part of the flute, its so-called foot, was lengthened, and thus \bar{c} was obtained in the room of \bar{d} . No attention was paid as to where to cut off the flute in order that \bar{e} , for instance, might be obtained, but the e hole was put high enough to be covered by the finger.

Thus of the C-flute of Böhm, that gives \bar{c} , and is 618·5 millimetres long, 37·61 millimetres had to be cut off to obtain $C\sharp$. The small holes of Böhm's flute of the year 1829 necessitated carrying up the hole 50 millimetres, the key-hole thus being 11·7 millimetres too high; on the new flute of 1832, the finger-hole is very

this key. His researches, however, led him to believe that it made its first appearance in France within a century of his own time. See his *Essay*, ch. i., sections 4, 5, 6; also *Rockstro on the Flute*, section 413, p. 221.

²⁴ The Doctor has forgotten that he has just told us that it was on a four, not a three-keyed flute, that Boehm played at first. However, he soon repairs the omission, and in the next sentence gives us the missing key.—C. W.

near the true place of $c\sharp$. The small finger-hole of the old flute being too high on account of the fingers, the tone is not so free as if the flute had been cut off at the place for the finger-hole, the oscillations of the upper air column being interfered with by the partial co-vibrations of the air column below the hole. Hence the characteristic tone of the old flute, its colourless and feeble lower notes. For that reason the poets of the sentimental period always placed the flute in the hands of their desponding lovers. Only when the air column in the high notes was divided into four or eight aliquot parts did the notes become loud enough, provided they were not produced, as on the old flute, by fork-fingerings. Hence the old flute was used in the orchestra principally as an instrument for solos, and the old question "What is worse than one flute?" was answered by "two flutes." Mozart, too, disliked the flute.

This failing of the flute, which rendered it the favourite instrument of sentimentality, à la Werther or Sigwart, had to be remedied, and was actually remedied by Böhm from 1831 to 1832.

BÖHM'S NEW FLUTES. THE RING-KEY SYSTEM.

The first nearly remedied instrument was Böhm's so-called ring-keyed flute. (See Table I, figure 3).²⁵

This first sound instrument was 606 millimetres long from the stopper to the end, and 19 millimetres in diameter. Böhm, who as an artist had learned but too well how to discriminate the imperfections of the old flute, came to the conviction that those imperfections were mainly caused by the false position of the finger-holes. He found the right positions by means of rational experiments (Böhm, 'Ueber den Flötenbau,' &c., Mainz, 1847, p. 24). He cut off the tube giving the note \bar{c} until the tube gave $\bar{c}\sharp$, marking this point on

²⁵ Fig. 11 of this work, p. 104.

another full-length tube of the same dimensions, and so on to the left hand from \bar{c} to $\bar{\bar{c}}$. The second tube was thus covered with points giving the notes of the c scale, determined by the sections of the first tube. He then bored at each one of those points a hole as large as could be covered by the finger. The notes, however, were, on account of the smallness of the holes, too low in pitch; Böhm therefore corrected these holes on a third tube, moving them up towards the embouchure, until the notes reached the requisite pitch. Thus Böhm obtained fourteen note-holes on his tube, all of the same size and in their rational position to one another. Compare the holes and the hole-position of the best English eight-keyed flute; it has holes of three different sizes, the largest in the middle! By these fourteen tone-holes the chromatic scale from c to $\bar{\bar{c}}$ could be obtained at an equally tempered pitch and with a full tone. This was the first advance in the construction of flutes.

The nine fingers of the two hands were, of course, insufficient to cover these fourteen key-holes; this circumstance, however, was no obstacle to our ingenious Böhm. He severed the key end, the rod of the key, from the key itself, thus bringing the key end under the proper finger, and the key itself over its hole, no matter how far the hole was from the finger. This was effected by simply applying a thin steel axis (Stahlaxe), which he could make as long as was necessary, parallel to the axis of the flute, consequently on the length-side (Langseite) of the instrument, fixing the key-leaf or touch at a right angle on one end of the axis, and the key which was to close the key-hole on the other end.

The spring which was to press the key on the hole, had formerly been constructed in the crudest way possible, after the fashion of locksmiths, for instance, who fasten their springs to door-locks. The spring had, in addition to its own rebounding movement, to perform

a sliding, and hence a vibratory movement, which was as irrational as possible. Böhm therefore first applied gold springs; and subsequently, instead of gold springs, fine English sewing-needles, which he heated on a tin plate, holding it over a spirit lamp until the white needle appeared blue, thus turning to a most excellent spring.²⁶ He fastened this spring under the key axis at one end into a short pillar, the other end bore on a short pivot (Zaepfchen), the so-called nose, whereby of course the axle was turned with the key. The spring acted here by its elasticity only, and the surface it had to run over with its end was reduced to a minimum.

Since a finger, on account of the insufficient number of fingers, had to do the work of a wanting finger, in other words, since it had to press down a key above or below in addition to its proper work, Böhm turned the key end (Griffblatt), which had come to be placed at the upper end of the axis over the hole, into a ring encircling the hole and leaving the opening free, in such a manner, that the finger while closing the hole pressed down at the same time the key on its hole at the lower end of the axis. A narrow groove cut in the wood round the hole received the ring, and thus did not prevent the finger from covering at the same time the hole. Thus Böhm gained a finger, the finger that closed the hole above closing also by means of the ring the key on the low part of the flute. In this ingenious way it became possible to cover all the note holes that could not be reached by the finger, with the finger working on other note holes; and the whole chromatic scale from \bar{a} to \bar{b} flat, that is, twenty-one notes, could be played without changing the position of the fingers.

This is the history of the origin of Böhm's ring-key system, which together with the rational position of holes on the flute, arose in 1832.

²⁶ The needle springs were patented by Buffet, see p. 49.—C. W.

The flute-players took great pleasure in the new flute ; not so the flute-makers ; for Böhm's key-mechanism was the work of a watch-maker, and could not be produced by a maker of musical instruments, so as to answer the purpose. Böhm played publicly on his new flute at Munich as well as elsewhere, and always to great advantage ; thus he also played in a "Concert spirituel"²⁷ at Munich, November 1st, 1832. The reviewer of the 'Allg. Mus. Zeitung,' who writes without any technical knowledge in the matter, says, "Herr Böhm gave us much pleasure with his new flute, made by his own hand, and improved by new keys and apertures, so as to serve higher effects" ('Allg. Mus. Zeitung,' 1833, p. 44).

GORDON'S EXPERIMENTS IN FLUTE-MAKING AND HIS SAD END.

In 1833 Böhm again went to Paris, where he arrived on the 9th of May, causing as much enthusiasm through his playing as through his flute. Thence he repaired to London, playing in concerts and entr'actes, thereby gaining ever increasing acceptance of his flute. There his old friend Colonel Gordon soon hunted him up.²⁸ Gordon had studied Böhm's new flute ; the position of holes in Böhm's flutes found favour with him ; his key-system, however, he wanted to adapt to the old key-

²⁷ A *concert spirituel* is a concert given on a holy day on which the performance of an opera is forbidden.—C. W.

²⁸ Boehm appears to have invented some mysterious method of travelling, in comparison with which the wonders of Aladdin's lamp and Prince Husayn's carpet sink into insignificance.

He arrived at Paris in May, and went thence to London, and yet Gordon was able to look him up in London in the January previous. Either the interview between Boehm and Gordon reported by the Doctor to have taken place in London at this time, or Gordon's letter to Boehm, is apocryphal, the two being irreconcilable. We are evidently getting into the region of romance. The Doctor appears to be gifted with an imagination almost as lively as that of Mr. Rockstro.—C. W.

system, although both Drouet and Tulou had pronounced against it. At his very first acquaintance Böhm had proved to Gordon the impossibility of covering fourteen holes with seven fingers. A short time after Böhm's departure from London for Munich, Gordon, too, quitted London and went to Paris, continuing his attempt at improving the flute ; but there he was just as unfortunate as in London.

On February 15th, 1833, after Böhm's public appearance with his flute in Munich and Paris in 1832, Gordon at last wrote a letter to Böhm at Munich, the original of which, in French,²⁹ lies before us, and runs thus :

LAUSANNE, *Feb. 15th*, 1833.

"MY DEAR SIR,

"For the last fortnight I have been back at home at Lausanne, after a pretty long stay in Paris, whither I went from London soon after seeing you there when you left for Munich.

"I have lost no time, working hard and perseveringly at a new flute which I have made myself, as best I could, and which I have just finished.

"I have in no wise forgotten you, and have been always expecting you to send me an improved flute that you proposed to try and make on your return to Germany. According to your offer in London, I want to send you my flute, asking you to make me a nice one after this pattern, considering that I have the complete fingering for playing it. I will send you at the same time the tablature of the fingering.

"I did not wish to send you my flute before hearing from you. Pray, then, write to me at the following address :—*A Monsieur Gordon, à Lausanne en Suisse*, and tell me how you think I should send it so that it may reach you without being damaged ; and if you can make

²⁹ The original will be found at p. 150. The postscript, however, was not published by Boehm. It here appears for the first time.

a similar one, do go to work with it as soon as possible. Hoping that my letter will find you at Munich, I send it to the address you have given me.

“Believe me, &c.,

“GORDON.

“P.S.—Have you still your good workman about whom you talked to me in London?

“I have seen Drouet in Paris. He approves of my flute, but he recoils from a change of fingering. Tulou is of the same way of thinking.”

Böhm answered him to the effect that he thought it best for Gordon to come to Munich. He placed his factory and his best workman (Grevé) at Gordon's disposal, declaring that Gordon could make as many experiments as he liked. Gordon took Böhm's advice, and arrived, a short time after Böhm's reply, at Munich, and made himself at home in Böhm's workshop. He was so convinced of the excellence of his system, that he sent on July 15th, 1833, a large number of prospectuses to the instrument maker Mercier, in Paris, setting forth his ideas on his new flute, and asking him to hand them to the musicians and flute-artists in Paris named therein. He wrote that he had an excellent workman (Bohm's) who was working at an improved flute after his pattern, and that he (Gordon) would shortly start for London. The letter runs thus³⁰ in the original (French).

However, the first flute made after his model did not answer, and his journey to London was given up. More models were made and discarded. One flute was changed and experimented upon, until it became quite useless; another shared the same fate. At last a third one was made which answered his ideas. After having worked at Munich for a whole year, Gordon went to

³⁰ The letter is quoted at p. 147, and an English translation is given at p. 132.

Paris, where he published a half sheet, on which his flute with the key-system was lithographed. This sheet he sent to Böhm, and the original of it is in my hands. In the *précis* of his key-system on the first page he says :— “ The suppression of the two F keys and the substitution for them of a key for F \sharp is an idea, the application of which offers great advantages. The idea of this key for F \sharp communicated by Mr. T. Böhm of Munich, has been, with his consent, adopted for the present flute, of which it completes the means of execution.” This avowal dates from 1834, after Gordon had already left Böhm's workshop.

In this new flute the E hole, for instance, is not, as in Gordon's old English flute, placed too low, too far from the other holes, and, moreover, covered with a key. The \bar{e} hole occupies exactly the place it has in Böhm's flute. Gordon called his flute “*flûte diatonique.*” One can see the resemblance in the position of the finger holes to the flute of Böhm, in whose workshop it originated. On the other hand, we notice a tangle of keys and levers, that, although ingenious, rendered the execution of passages far too awkward. However, Gordon did not lose heart, and was not dismayed. He went on working at his flute. In another instrument, made in Paris, a drawing of which is given by Coche, the tangle of keys in the higher part is still greater; nay, one of the levers is connected with a key by a steel wire. In 1837 Gordon, already mentally affected, wrote to Böhm's workman, Grevé, who had made his first flute at Munich, to ask him to join him in establishing a flute factory for Paris, London, Vienna, &c., although Gordon seemed to have lost all confidence in his flute, as a year before, on meeting Böhm in London in 1836, he asked Böhm for one of his flutes on the Böhm system. Gordon had undermined his fortune by his mania, and was crestfallen in general. Böhm, on his return to Munich, wrote to Gordon at Lausanne, asking whether Gordon

would like a flute after Böhm's model; Gordon's wife however, replied to Böhm, that her husband was very ill, and there was no need for sending the flute. Böhm never heard any more from Gordon. A countryman of Gordon's spread the news that Gordon had thrown his flute into the Lake of Geneva, and died in an asylum.³¹

SPREAD, RECOGNITION OF, AND ATTACKS ON BÖHM'S FLUTE.

Ever since the last years of the third decade of the present century I have lived on friendly terms with Böhm, and, alas! was destined to be his biographer. I was perfectly familiar with the daily events at Böhm's workshop, and a witness of all the operations of Gordon at Munich.

The first report on Böhm's new flute was, namely, the one in the 'Allg. Mus. Zeitung,' which we have already seen. The first elaborate report on Böhm's new flute was given by me in the same 'Allg. Mus. Zeitung,' in 1834, previous to my trip to England; more than this had not at that time been published in Germany on Böhm's flute ('Allg. Mus. Zeitung,' 1834, pp. 71-73). By that time Böhm had played on his new flute at a Court concert, and two other concerts of the Academy of Music with extraordinary applause. However, all inventions have to struggle against envy, the manœuvring

³¹ The report that Gordon died by his own hand appears to have originated in an expression used inadvertently by Mr. Walter Broadwood in his preface to Boehm's *Essay on the Construction of Flutes*, where he speaks of having defended Boehm from the charge of driving Gordon to "despair, insanity, and suicide." It is unhappily too true that Gordon "disappeared from view" in an asylum at Lausanne, but, as far as I have been able to ascertain, not the faintest whisper of a suspicion that he took his own life was heard before the book brought out by Mr. Broadwood appeared. No particulars of Gordon's death have come down to us. All we know is that Fétis states that he was still alive in 1839, but that Boehm, writing in 1847, speaks of him as dead.—C. W.

of the detractors being always the same: they assert that they have long had the same idea, or they try to prove that the invention is not a new one.

On May 25th, 1838, the celebrated flute-player, *Jean Baptiste Coche*, in Paris, writes to Böhm: "It is said amongst artists that the flute bearing your name was invented and discovered with all its present improvements (*perfectionnements actuels*) by one Gordon, &c." Coche was the first to exchange Böhm's new flute for the old, publishing also a brilliant comparison of the old and new flute, and being instrumental in introducing Böhm's flute in the Paris Conservatory. He has likewise published a good school for the new Böhm flute ('Examen³² critique de la flûte ordinaire comparée à la flûte de Boehm, présenté à MM. les Membres de l'Institut Académie Royale des Beaux-Arts, Section de la Musique, par V. Coche, Professeur en Conservatoire,' 1838).

What Fétis writes in his well-known Dictionary on Böhm's flute, is nothing but an accumulation of errors and inaccuracies of all sorts, ludicrous in such a small article—a worthy pendant of superficiality to so many other articles in that Dictionary. Fétis places Böhm's invention in the year 1849 (Gordon being then dead for about twelve years), although Böhm's French letter, setting forth clearly his relation to Gordon's flute, dates from July 12th, 1838, and although Coche's excellent work, 'Examen critique, &c.,' appeared in the same year. Fétis is thus eleven years too late respecting the year 1849. In his work 'On Flute-making' (in German), of the year 1847, and translated into French in 1848, Böhm had explained his relation to Gordon and his

³² This is not the *School for the Flute*, but the pamphlet in which Coche compares the old with the new flute. His *School for the Flute* bears, as already mentioned, the very different title of a *School for the New Flute* invented by Gordon, modified by Boehm, and perfected by Coche.—C. W.

flute, adducing Gordon's own correspondence. In that "famous" article of his, Fétis says: "At the same time (1849) an Englishman named Gordon (Gordon was no Englishman, and by that time he was already dead) busied himself with the improvement of the flute, and solved the problem!" The rest of the article is unintelligible; I give it, therefore, in the original French. The solution of the problem was made "par un système d'anneaux remué par un tige mobile, dont les combinaisons attaquaient à peu près le but."³³ These few words make it evident that the reporter possessed no idea whatever of the construction of a flute and of Böhm's ring-key system.

Fétis writes of the improvement of the flute by Gordon in the year 1849 (in which year Gordon had been dead already twelve years), of whom, as Fétis alleges, Böhm had in a stealthy way learned the secret; whilst a Munich reporter writing on a divertimento of Böhm's composition, which the latter played at a "concert spirituel," November 1st, 1832, at Munich, expressly mentions that Böhm played his composition on his new flute "which he had re-shaped with his own hands by the addition of several keys." ('Allg. Mus. Zeitung,' 1833, p. 44). A year later I wrote a report in the same musical periodical (36th year, 1834, on Böhm's new flute, No. 5, pp. 71-80), and the good Fétis makes Gordon appear to be busy with the improvement of the flute in the year 1849, that is at a time when Gordon had long been dead, while Böhm had already played on his new flute in Paris in 1832, that is, seventeen years previously.³⁴

³³ The words used by Fétis are: "par un système d'anneaux réunis par une tige mobile, dont les combinaisons atteignaient à peu près le but."—C. W.

³⁴ I have had occasion to call attention to a singular instance of word-blindness on the part of Mr. Rockstro, whose eyes obstinately refused to reveal to him the presence of the words *Tablature Gordon* in a certain sentence. We now have to notice a not less remark-

On the Gordon flute there were no rings, and no combination of ring-keys either. Gordon published a lithographic drawing of his *flûte diatonique* in 1834. Another drawing of the last Gordon flute is to be found in Coche's 'Examen critique'; there the key-mechanism is still more complicated than in his flute of 1834, but there are no ring-keys—nay, a few keys are connected with steel wires, as may be seen in the drawing.

At the Industrial Exhibition of all Nations in London, 1851, I dwelt elaborately, in my capacity as one of the jury for musical instruments, on Böhm's new flute that had carried off the first great medal. ('Official Report on the Industrial Exhibition of all Nations in London

able affection of the visual organs of the worthy Doctor. His retina became so congested when he read the articles on Boehm and Gordon in Fétis's Dictionary as to transmit to his sensorium the word Gordon instead of Boehm. It is not Gordon whom Fétis represents as engaged in flute-making in 1849 but Boehm. He mentions that he saw him at Munich at that time, and found him thus occupied, and he states (incorrectly, as the Doctor very properly says) that it was in that year that he introduced his cylindro-conical flute. It is true that Fétis uses the words "at the same time," but they refer not to the year 1849, but to the time when Boehm was endeavouring to improve the old flute.

That Fétis wrote too much, and so sacrificed his reputation for accuracy, is universally admitted. Of this there are proofs enough in these two articles. His description of Gordon's mechanism quoted by the Doctor (a system of rings united by a movable rod) applies not to Gordon's but to Boehm's flute. It was Boehm, not Gordon, who made use of rings and movable rods. Gordon endeavoured to solve the problem, as Fétis himself says in another place (art. Gordon), by means of crescents, whose movements were transmitted not by rods but by wires and cranks. There were no rings on Gordon's flute as figured by Coche, and the one movable rod visible in the drawing of it (p. 107) is in the mechanism for F sharp which was taken from Boehm.

In neither of the two articles does Fétis accuse Boehm of acting in a stealthy manner as Dr. Schafhäutl states. He represents Boehm as becoming connected with Gordon, recognising the value of his invention, and proceeding to perfect it.—C. W.

in 1851, by the Report Committee of the Governments of the German Zollverein,' i. p. 882). At the General German Industrial Exhibition at Munich in 1854, I likewise analysed Böhm's invention which was again crowned unanimously with the great memorial medal. ('Report of the Jury of the General German Industrial Exhibition at Munich,' 1854, p. 144.)

At the Industrial Exhibition in Paris, in 1855, Böhm again got the first great gold medal, together with the declaration of Prince Napoleon: "Ce nom est une autorité et une puissance" (this name is an authority and a power). (See 'Visites de S.A. le Prince Napoléon aux Produits collectifs des Nations qui ont pris part à l'Exposition de 1855'). In the 'Allg. Mus. Zeitung' of 1879 I have written the history of Böhm's flute up to the most recent time: 'Allg. Mus. Zeitung,' 1879, p. 643.

After Böhm's death the old fable was revived even in England, so that a flute-artist applied to Munich for more definite information as to Böhm's title to the flute bearing his name. I have written up the whole history of Böhm's invention, giving the evidence for Böhm's right to his flute. My statement has been published in the 'Musical World' of February 18th, and reprinted in the 'Musical Opinion,' March 1882, pp. 226-227.

BÖHM'S TRIP TO ENGLAND. SCHAFHÄUTL'S IMPROVEMENT IN THE CONSTRUCTION OF THE PIANOFORTE.

In 1833 Böhm went with his new flute from Paris to London, causing general sensation by the volume of its tone, as we shall see later on. He made himself acquainted with the manufacturing of musical instruments on the grandest scale, the grandeur of which filled him with astonishment and admiration, and made so deep an impression on his mechanical genius, that we shall see him henceforth devoting himself for some time to

industrial occupations lying far away from music and musical life.

Already after his first return from London he had much impressed me with England's grand activity in politics, industry, and art—a country where all new departures in applied science met with a ready recognition, where liberty, wealth, and splendour had elevated London to a centre for everything that was beautiful and grand, especially in the department of music. Böhm described this country in glowing colours, and awakened in me a longing to see this, the promised land of mechanical art.

For a long time I had occupied myself with the idea of giving such a form to our grand pianos as would unite the whole compass of their notes in one harmonious and uniform whole. I have not yet seen a grand piano where all the notes have been in full harmony with one another. Something was wanting, either in the upper, in the middle, or in the low section. Böhm deemed my idea very interesting, and took it up with his usual ardour. The idea had to be realised. He sketched out rapidly the requisite plans, and secured for their realisation a commercial firm which commenced at once to execute our ideas with the help of three workmen. Two of the latter, however, wilfully changed the model given them in its most essential principle, and went to London, backed by the not over scrupulous head of the firm, taking with them the model, for which they secured a patent.

The piano-maker who had been Böhm's partner was involved in a gigantic law-suit.³⁵ I also³⁶ went to

³⁵ There were two patents involved in this litigation, the one taken out by Frederick Ludwig Hahn Danchell, and stated to be partly a communication from Frederick George Grenier, the other by Boehm's friend, whom the Doctor here calls his partner, Robert Wolf. Both patents were ultimately sealed.

From Wolf's specification we get an idea of the Doctor's improvement. It is described as "consisting in the new construction, on the principle of acoustics, of a sounding body applicable to every

London in 1834 ; the law-suit was won. The fruit, however, of the successful law-suit was, as is always the case, the same in London as everywhere else. The law-suit had eaten up the means for the realisation of the project. The construction of a piano according to my idea would have made the instrument more expensive, and therefore the further execution of the plan was discarded. However, a gigantic law-suit carried out by two foreigners in London is a strange and fascinating episode in one's life.

In 1833 Böhm went, as already observed, with his flute to England, and there he caused as much sensation amongst musicians as amongst amateurs, especially amongst amateurs of the upper and highest classes of English society. His playing was admired everywhere, the majority of amateurs on the flute amongst the nobility and gentry took lessons of him, and Böhm the gentleman was very soon introduced as a friend into the families of his noble pupils.

THE ENGLISH IRON FOUNDRIES AND SMELTING FURNACES.

His flute and his gentlemanly behaviour opened for him the way to the largest of the metallurgical works, which was as a rule absolutely closed to outsiders. I

description of pianoforte." The invention is stated to consist "in substituting a hollow receptacle or shell of a curvilinear shape in lieu of the usual sounding board of pianofortes. The precise shape of the sounding body is not material, provided the sides be curvilinear, or limited by curved lines." There was, of course, to be a hole in the sounding body ; indeed, three holes are recommended.

It appears that there have been attempts both before and since this time to substitute a hollow for a solid sounding board, but they have never proved successful.—C. W.

³⁶ It would seem, then, that the pianoforte which Fétis states gave occasion to Boehm's visit to London in 1834 (see *supra*, p. 277) was not his own overstrung instrument, but that invented by his friend Dr. Schafhützl.—C. W.

made frequent use of this favourable relation of Böhm's ; being equally interested in the vast and celebrated cast steel foundries of Sheffield. For what may be found in our technical books on English foundries gives but a very poor idea of the grandeur of those industrial centres, besides being frequently erroneous.

We were equally interested in the fact, that the iron so plentifully produced in England was not adapted for the manufacture of the finest English cast steel, for which only the purest Swedish merchant-iron (Stabeisen) from the magnetic iron-ore at Dannemora, or, for iron of second rate quality, from the Russian ironworks of Prince Demidoff, could be used. The production of pig iron and bar iron was likewise as interesting as it was novel, and also the gigantic operations.

Schiller in his poem 'Der Gang nach dem Eisenhammer' tells us of the works of the Count, where in a high "furnace-fire melted the lump of iron ore:" our furnaces then were 2 metres, in the best 6 metres high. The high furnaces of England are 15 to 18 metres high, real towers built on slopes, the upper part of which one reaches by means of bridges, and where there are no mountains, people are forced to get up the coal or ore by means of an incline or a crane. The most remarkable thing was the English method of producing in a short time such quantities of wrought iron and pig iron as had hitherto been considered impossible. It is this marvellous process that has changed not only our whole technical existence, but also led to quite novel phases of our social and political life. Without that English process the manufacture of our rails, and consequently our system of railways connecting nations with nations of whom they knew nothing before or only by hearsay and fable—our powerful vessels of 400 horse-power which plough all parts of the ocean—the very thought of such things would have been folly, but for an invention made by Cort, a simple iron-worker in Gloucestershire.

Wood had become very scarce in England, and large forests like those of the Continent had long disappeared. Coal was used as fuel, England possessing an abundance of coal; coals, however, on account of the sulphur contained in them, could not be used in the production of wrought iron, and consequently the best quality wrought iron had to be procured from the Continent, and its price was soon doubled. Cort conceived the idea of exposing the pig iron to the flames only of the burning coal, thinking, as he rightly did, that the pig iron must not come into contact with the coal on account of the latter's sulphur. The experiment succeeded completely.

The pig iron was melted to a paste on a flat hearth by means of the flames of pit-coal, and then stirred incessantly until the liquid iron turned into a tough wrought iron. The stirring and turning in a mass of that kind, or in clay, was called originally puddling in English, and therefore this new method of producing wrought iron in the furnace is called puddling, and the furnace with its flat hearth a puddle-furnace. Cort took a patent for his invention, but like most inventors, he reaped no benefit from it and got ruined, and not before the process of puddling had been made free and generally accessible, was it brought to its present state of perfection. The new process, in addition to its being advantageous to England, had this advantage for the whole world, that a much larger quantity of ready wrought iron could be produced than was possible by the process in use on the Continent, and it was this peculiarity of the puddling process that gave a new turn to our social and technical life. While our puddling hearth on the Continent could produce 50 to 60, or at most 70 to 80 cwt. of wrought iron, a simple puddling furnace yields at least 300 cwt.

BÖHM ESTABLISHES ENGLISH SMELTING FURNACES
IN GERMANY; BECOMES A PUDDLE-MASTER.

Böhm immediately saw the importance of this kind of bar iron production for his country, Bavaria. I initiated Böhm into the theory of this process and the marvellous system of iron-works generally, and Böhm the flutist soon became as well acquainted with the puddling furnace as with his flute.

England was henceforth more than independent of the supply of iron from foreign countries, but for the production of the so-called English cast steel, the best in the world, it could not be used. In smelting the English ironstone, the so-called clay-ironstone, other substances besides iron, such as flint and clay, were reduced to silicium and aluminium, uniting with the iron; the pit-coal flame in the puddle furnace always yielding a small portion of sulphur that united with the iron. I made several chemical analyses and soon succeeded in removing the superfluous parts from the iron during the puddling process; the means of doing that were, however, too expensive, and not available in large quantities. Finally, means that could easily be made available were found out, which answered the purpose almost as well as the expensive ones. The foundry owner under whose auspices our experiments were made, took a patent for the new process, and Böhm hastened back to Munich to introduce the English puddling process in Bavaria, where the old method was still in use. The introduction proved a perfect success, and the puddling process was introduced in all iron-works in Bavaria. This secured for Böhm, on January 2nd, 1839, the Cross of the Knights of the Order of Merit of St.-Michäel.

Böhm then visited the iron-works on the Rhine and its neighbourhood, where he introduced the new patent in the vast iron-works of M. de Krämer, and also in

those of Stumm. Meanwhile the new process was published by the Journal of the Patent Office. In Germany, therefore, a patent could no longer be obtained; nevertheless, Böhm visited the owners of Austrian and Bohemian iron-works, superintending during the day the puddling process as puddling-master, and appearing in the evening as a flute-artist. The miners would congregate in front of his house, listening with delight to his playing. Once, at a Bohemian iron-foundry, he thought he heard a noise outside the door. He opened it and found the whole staircase crammed with miners. After the first surprise one of the miners who stood nearest to him, addressed him in the following simple way: "You do allow us to listen to your playing, don't you? We shall all keep quiet." Böhm bade them enter, and delighted them every evening with his art.

He now travelled in a double capacity, as a flutist and as a mining engineer—according to circumstances—and his flute introduced him to many a house in Germany, wherein the foot of a simple miner would have never chanced to tread.

SOJOURN IN PARIS, 1834. THE ACOUSTICIAN SAVART.

Böhm returned for a short time to Munich to see to his foundries, and soon left for Paris at the end of June 1834, while Gordon was still working at his flute. In Paris he again played on his ring-keyed flute. The celebrated flutist Vincent Dorus, who was in the orchestra of the Grand Opera, gave up his old flute as soon as he heard Böhm's instrument, which he forthwith began to study. The young artist was then twenty-two years old, and he soon got versed in the fingering of the new flute.

We have seen already that Böhm's new flute had made a great sensation in Paris, in spite of the fact that

the old flutists, like those in Germany, would not accept it. However, Farreau, Camus, and Laurent, the celebrated instrument-makers at the Palais Royal in Paris, knew already in 1833 Böhm's flute, as well as Gordon's model, and there was no doubt as to which of the two flutes was the superior. That Böhm's flute was not known more rapidly beyond Paris was Böhm's own fault, he devoting, as he did, several years to the manufacture of iron and steel. But after Böhm's reappearance as an artist, at the beginning of May 1837, his flute made its way very quickly through Paris and France.

Before everything Böhm was anxious to hear the opinion of real experts, of learned acousticians, and therefore applied to Savart, then the most celebrated acoustician. At first Savart took little notice of Böhm's statement that on his flute one could play with purity in all scales, declaring that it is "an impossibility to produce a perfectly pure scale on a flute." Böhm, however, convinced Savart by facts of the contrary. Savart was exceedingly surprised and spoke in a very flattering way to Böhm, and it was through him that Böhm read a sketch of his invention, illustrating it by his playing, to the Académie des Sciences, May 4th, 1837. The flute was then minutely examined by a committee consisting of celebrated academicians and professors of the Conservatory, de Prony, Duiong, Savart, Paer, and Auber, and after gaining a brilliant report, produced a general interest.

COCHE IN PARIS MAKES CHANGES IN BÖHM'S FLUTE.

Amongst the first persons who devoted an enthusiastic study to Böhm's flute was the excellent flutist Victor Jean Baptiste Coche, of whom I have spoken above, a pupil of Tulou's of the Paris Conservatory, who

in 1831 had received the first prize when a young man of twenty-one, and was forthwith appointed teacher by the side of Tulou. Exactly a year afterwards Böhm appeared in Paris with his new flute, and most of the young flutists were quite enthusiastic about the new instrument.

On November 7th Coche wrote to Böhm: "I cannot express to you all the admiration I feel every day in studying your magnificent and rich instrument which will certainly make a very remarkable revolution in wind instruments. Hence I cultivate it with much ardour. May I one day be worthy to share by my execution the suffrages that rightly belong to this beautiful invention."

Coche developed in a separate essay the advantages of Böhm's instrument (see above), and wrote in 1839 an elaborate school for the Böhm flute.

It is to be regretted that there arose some differences and misapprehension between the modest Böhm and his former admirer Coche. Coche introduced in 1838 a so-called improvement in Böhm's flute. It consisted in that the $g\sharp$ key, which according to Böhm's principles was left open, was changed into a closed key, this closed key being handier for the artists who were used to the flute than Böhm's open $g\sharp$ key. This key was announced to the whole world as being an improvement; Böhm replied in vain, that the improvement was quite unsystematic, since all the notes of the chromatic scale could be played with purity on his flute with his key. This did not avail him in Paris. His flute with the improvements of Coche and Daru (Dorus) began to become the fashion there, and up to the present time all Böhm flutes are being made in Paris with a closed $g\sharp$ key.

Böhm says with regard to that: "All discussions concerning my flute refer, properly speaking, to the key-mechanism, which, as a rule, everybody judges according

to his individual opinion, every player considering that the best arrangement which corresponds best to his fingers. I have always laid stress on my key-system only in so far as I thought to have reached my goal in the simplest way by being consistent; the one principal point was the improvement of the flute in all its acoustic relations, the greater or lesser perfection of all musical instruments resting chiefly on that, while the mechanism is of subordinate importance. It is also much easier to construct keys than to improve notes."

Our Böhm was, as we saw, virtuoso and mining engineer alternatively. Thus, after playing in Paris he appeared in London at the fifteenth evening concert of the new Music Fund for the Relief of Decayed Musicians, their Widows and Orphans, on Friday the 17th of June, 1836, playing on his new flute.

All that London and the whole world could muster in great singers of both sexes could be heard at that concert. Madame Grisi, Mdlle. Assandri, Signor Rubini, Signor Lablache, and Signor Tamburini represented vocal music. As instrumental virtuosi there were: M. Ole Bull, M. Lindley, and Dragonetti, the former one of the most powerful violoncellists, the latter the Paganini of the double-bass. M. Casimir Backer played a fantasia on the harp. After Ole Bull the bill announced M. Theobald Böhm, who was to play a fantasia on his newly invented flute, adding, this "being his first performance in London this season."³⁷

³⁷ NEW MUSICAL FUND.

This Evening, Friday, June 17, 1836.

PROGRAMME OF THE CONCERT.

PART I.

Grand Sinfonia, No. 7	<i>Haydn</i>
Duetto, Signor IVANOFF and SIGNOR TAMBURINI, "Ove vai" (Guillaume Tell)	<i>Rossini</i>
Aria, Mlle. ASSANDRI, "Se Romeo" (I Capuletti ed I Montecchi)	<i>Bellini</i>

The instrument-makers of London now took an ever-increasing interest in Böhm's flute. In conjunction with several manufacturers, Böhm constructed several musical instruments.

By the end of July Böhm repaired to his own country

Sonata, Violoncello and Contra Basso, Mr. LINDLEY and Signor DRAGONETTI	<i>Corelli</i>
Duetto, Mrs. H. R. BISHOP and Miss MASSON, "Deh! con te" (Norma)	<i>Bellini</i>
Polacca, e Quartetto, Madame G. GRISI, Signor RUBINI, Signor TAMBURINI, and Signor LABLACHE, "Son virgin vezzosa" (I Puritani)	<i>Bellini</i>
Duetto, Signor RUBINI and Signor LABLACHE, "Se inclinassi" (L' Italiana in Algeri)	<i>Rossini</i>
Mr. OLE B. BULL	
Will perform, on the Violin, an Adagio Sentimentale and Rondo Pastorale	<i>Ole B. Bull</i>

PART II.

Un Morceau de Poësie Musicale Romantique, intitulé, "Marche au suplice et délivrance d'un innocent," pour la Harpe, M. CASIMIR BÆCKER, from Paris	<i>C. Bæcker</i>
Air, Mrs. W. KNYVETT, "Let the bright Seraphim," Trumpet Obligato, Mr. HARPER (Samson)	<i>Handel</i>
Irish Melody, Mr. HOBBS, "There is not in this wide world a valley so sweet."	
Fantasia in A b, Mr. THEOBALD BOEHM, on his newly constructed Flute (being his first performance in London this season)	<i>Boehm</i>
Air, Mr. BELLAMY, "Honor and Arms" (Samson)	<i>Handel</i>
Ballad, Miss WAGSTAFF, "Go, forget me"	<i>P. Mortimer, Esq.</i>
Recit. and Air, Mr. LEONI LEE, "The fulness of thy presence" (The Omnipresence of the Deity)	<i>T. Barnett</i>
Capriccio-Fantastico for the Violin, Mr. OLE B. BULL (without accompaniments)	<i>Ole B. Bull</i>

The Subscribers and the Public are respectfully acquainted that Madame CARADORI ALLAN is not sufficiently recovered to fulfil her kind promise of singing in this Concert.

The Instrumental Band

Will consist of many of the most celebrated Performers from the Orchestras of the Philharmonic Society, the Italian Opera House, some of the Pupils of the Royal Academy of Music (by permission of the Noblemen and Gentlemen forming the Committee of that Institution) and the Members of the New Musical Fund.

All the Performers have most kindly promised their gratuitous aid upon this charitable occasion.

Books of the Performance, with a List of the Subscribers, can be had (Price one shilling only) at the Opera House.

in order to visit the Austrian foundries. On his arrival at the frontier of Austria he was taken ill with a violent attack of cholera ; his iron constitution, however, saved him in this case too. In his illness he suffered very much from thirst. At last his physician permitted him to drink water, but he soon got fearful cramps, and the physician was at a loss what to do. Böhm quickly recovered, but the thirst again set in. He asked his nurse for water. The woman refused it at first, knowing, as she did, what terrible consequences it would have ; finally, she yielded. Böhm, however, cautiously kept the water in his mouth, not swallowing it before it had become warm, and repeating this proceeding as long as he felt thirsty, he soon recovered. From that time onwards he became a most ardent adherent of water as his only and favourite beverage to his end.

His flute factory had meanwhile been conducted by his excellent workman Grevé, Böhm thus being enabled to devote his time to foundries. In 1838 he travelled through Austria, or rather Bohemia, visiting its foundries.

Meanwhile Coche had extensively introduced Böhm's flute in Paris ; at the same time, however, there arose, as we have seen, a rumour amongst musicians, that Böhm's new flute was, properly speaking, the invention of the above-named Colonel Gordon. Coche wrote on that to Böhm, dated May 25th, 1835. Böhm replied on June 2nd of the same year. Coche published Böhm's letter, and also that of Madame Gordon ; Gordon himself was ill and demented, as we have seen above. Coche had laid Böhm's flute, of course in his own improved form, before the Paris Académie Royale des Beaux-Arts. The committee consisted of Cherubini, Paer, Auber, Halévy, Carafa, and Berton as reporter, all world-famed names. The academicians adopted the report of Berton, as was testified by Quatremère Quincy, the secretary of the Académie. Berton sent Coche his

minutes fully acknowledging the value and ingenuity of Böhm's invention.

The reason why Paris flutists came to consider Gordon as the inventor of Böhm's flute may be found in the circumstance that Gordon, a former pupil of Drouet, had communicated both to Drouet and Tulou, the celebrated flutist, his ideas about an improved flute; the system seemed to them acceptable enough, but they energetically objected to an innovation in the old fingering. It is hardly to be expected that two such celebrated virtuosi would ever make themselves familiar with the essence of Gordon's and Böhm's system.

Böhm has left us the history of his invention in a separate *brochure*, entitled 'On Flute Construction' (Mayence, 1847), where he says very convincingly, "I think the most conclusive evidence of the authenticity of my invention I can furnish is by showing the motives that have prompted me to invent the new construction; and by the explanation of the acoustical and mechanical principles I have made use of. For he alone is able to make a thoroughly rational work, who from the very outset can give a clear account of the Why and the How in the execution of every single part." Böhm translated this pamphlet into French, dedicating it to his friend Dorus, the celebrated flutist, who, as we have already heard, had discarded his flute as soon as he heard Böhm on the new flute. Dorus likewise contributed very much to the spread of Böhm's flute in France; Böhm gratefully recognised that in his dedication: "Your exquisite talent has rendered popular my flute of 1832 in France."

BÖHM'S IMPROVEMENT OF THE TRANSMISSION APPARATUS.

Böhm was still busily engaged in fitting up the Bavarian iron foundries, for which the King, as we have already seen, made him, on June 2nd, 1839, a Knight of

the Order of Merit of St. Michael, of the first class. In spite of that we find him at short intervals in Paris and London, closely studying technical works of the age.

Thus the so-called transmission apparatus—that is, the mechanical means employed for transmitting the motive power to various parts of a manufactory—had rendered necessary all sorts of complicated contrivances, such as shafts and wheels, which wasted by friction, torsion, and their very weight, more or less of the force.

With his marvellous gift for combination Böhm invented, incidentally as it were, during his stay in London, a new and very simple kind of transmission, without shafts and straps, of which he made a small model, which was so ingenious that he was prevailed upon to put it before the Society of Arts in London. The Society was so much pleased with the new mechanical idea, that they voted Böhm the big silver medal, which he received from the President, the Duke of Sussex, at the public meeting of the Society at Exeter Hall, June 8th, 1835.

BOHM'S LAST IMPROVEMENT IN THE FLUTE. THE CYLINDER FLUTE, 1847.

We have now reached the last and most brilliant remodelling of the flute, the cylindrical flute of metal and wood.

It dates from 1846-47. While Böhm was still busy in Bavaria with the introduction of a new invention by Faber du Four, consisting in a method of utilising the combustible gases escaping uselessly from the upper aperture of the furnace, he availed himself of every spare minute for the purpose of striking out a last improvement of his ring-key flute, making numerous experiments in his workshop. At last, in 1847, he gave his flute the final touch.

By constant exposure to the glowing heat of the puddling furnaces his eyes were much weakened, and

had become very sensitive ; no treatment proved of any use, and finally he was obliged to ask the King to pension him as a member of the Royal Court Band. At the end of September 1848 his request was complied with, his pension being fixed at 1080 florins.

Böhm could henceforth devote all his powerful energies to the spread of his new invention, no other work or obligation keeping him away from it.

We have already seen that Cloche (Coche), the celebrated flute-player in Paris, had explained to his countrymen the nature of Böhm's flute, thereby doing very much, both theoretically and practically, for the spread of the same. The flute was manufactured and turned out in great perfection by the Paris manufacturers, Godefroy aîné et Lot.

CARTE THE FLUTE-PLAYER'S WRITINGS FOR BÖHM IN LONDON.

Böhm's flute was made in England, and most perfectly too, by the celebrated and oldest London flute manufacturers, Messrs. Rudall and Rose ; and the celebrated flute-player R. Carte quickly exchanged the old flute for the ring-keyed flute of Böhm, giving, however, lessons on both. He wrote a complete School for Böhm's Flute, both with the closed and with the open *g*[#] key. That School reached several editions. Its title is : " R. Carte. A Complete Course of Instruction for the Boehm Flute (both the open and the *g*-keyed flute) for Beginners, as well as for those acquainted with the old Flute. 1845." He also wrote another interesting work : " The Boehm Flute explained. Analysis extracted from the Complete Course of Instruction for the Boehm Flute, by R. Carte. London, 1846."

This analysis is very clear. It may not only serve as an introduction to an understanding of Böhm's flute, but it also furnishes a complete instruction for the

production of notes in the first, second, and third octaves. In a separate section the so-called French improvements are discussed, namely, the closed $g\sharp$ key, in relation to the originally open key of the Böhm flute; and it is declared that the application of the open $g\sharp$ key on the Böhm flute, instead of the closed key of the old flute, forms one of its chief excellences compared with the old flute. Carte proves that by musical examples on a page and a half. This alone was a *demonstratio ad oculos* against the French prejudice, and a practical evidence of the perfection of Böhm's system that can be found in no other work. Carte also expressly declared that beginners get much more rapidly familiar with the fingering of Böhm's new flute than with that of the old flute. (Of Carte's writings and zeal for Böhm I shall treat in a subsequent section.)

In Paris, the excellent flute manufacturer, M. Clair Godefroy, bought of Böhm the right of making his new flute for 6000 francs. The instrument maker Lot did the same. He got a privilege on Böhm's flute, both old and new style. They spread their excellent instruments throughout France. Thus it came to pass that Böhm's flute was spread over England, France, and the whole world by Rudall and Rose, and Godefroy and Lot.

On its first wanderings many a curious bit of adventure happened to Böhm's ring-keyed flute. Flutists were, as a rule, at first startled at the sight of the new flute, and soon got into a dilemma on account of the marvellously beautiful tone of the new instrument on the one hand, and its new fingering on the other. In 1850 such a new flute had reached Naples, there causing general sensation among flute-players. Scaramelli, professor of the flute in the Conservatory, felt particularly attracted to the new instrument. Dr. Isenschmied, at present in Munich, who was at that time physician to the King of Naples, and also one of Scaramelli's pupils, relates as follows:—Scaramelli had to overcome a fierce struggle

between the old-fashioned flute and that of Böhm. The tone of the new flute greatly attracted him, but the new fingering was like a cold damper on his enthusiasm. He nevertheless unceasingly resorted to the new flute, trying it again and again, and finding at last that it worked more and more satisfactorily. He found that the difficulty of handling it, which seemed terrible at the outset, could be mastered in short time, and finally he was bold enough to wager with the flute-players of Naples that within four months his execution would be just as great on the new flute as it was on the old one. The wager was taken, and four weeks afterwards Scaramelli played on the new flute, amidst colossal applause, a flute concerto with orchestra, during an entr'acte at the S. Carlo Theatre. He also defended Böhm's flute against the attacks of a Florentine musician, proving that the latter had never grasped the principle that formed the basis of that instrument.

BÖHM'S ACCOUNT OF THE ORIGIN OF HIS NEW CYLINDRICAL FLUTE.

This ring-key flute, however, did not quite satisfy Böhm as regarded the tone and intonation of the high and low notes. This, the last drawback, could not be removed without a total change in the bore of the tube.

The endeavour to remove this drawback led Böhm to the invention of his last flute—the cylindrical one, with large sound-holes closed by covered keys, and with a conoidal head-piece.

“I always failed to understand,” says Böhm, “why the flute alone, amongst all tubular instruments with sound-holes and a conical bore, should be blown at its thick end, it being much more natural that the air-column sections, that become shorter by increasing tone-height, should also become thinner in proportion. I therefore tried to reverse the proportions, and soon found that my view was correct. It was not till 1847 that I succeeded

in manufacturing flutes according to a scientific system, for which I received the highest prize at the Exhibition in London in 1851, and in Paris in 1855."

"I had," he continues, "made a great number of conical and cylindrical tubes, of the most varied dimensions, and from all kinds of wood and metal, in 1846, in order that I might investigate their adaptibility for pitch, timbre, and tone-production. These experiments led to the following results:—

"1. That the volume and purity of the sound of those fundamental notes was in proportion to the volume of the vibrating air-column.

"2. That a more or less important narrowing of the upper part of the flute tube, as well as the reduction or increase in length of that narrowed portion, have a great influence on the production of notes and the pitch of the octave.

"3. That this narrowing has to be made in a certain geometrical progression, which yields a curve very near in form to a parabola.

"4. That the formation of vibratory nodes and sound-waves is produced easiest and most perfectly in a cylindrical flute-tube, the sectional width of which is equal to the $\frac{1}{30}$ th part of the length of the tube, and the narrowing of which, commencing at the upper quarter, is equal to $\frac{1}{10}$ th of the section where the cork closes it."

This is the origin of the present cylindrical flute. Further experiments taught Böhm that as regards the proportion of the width of cylindrical tubes to their length, the most beautiful tone is produced with a length of 606 millimetres and a diameter of 20 millimetres.

"The high tones, however, were not easily produced, and I was forced," he adds, "to make the tube 606 millimetres long by 19 millimetres in diameter."

Böhm made numerous experiments concerning the best size of the embouchure.

An embouchure of 12 millimetres in length and 10

millimetres in width will best respond to the wants of most flute-players. After these experiments Böhm made a thin and long tube of brass, which yielded the fundamental note \bar{c} on being merely breathed into, and the note could be increased to a very considerable force without losing its pitch. The wheezing sound of the air-current, which is so painful in ordinary flutes, was not audible.

Thus having determined the best dimensions of the tube, Böhm proceeded to the difficult investigation of the proper places of the finger-holes.

Böhm's second endeavour was to enlarge the note-holes to such an extent, that the flute might be considered as cut off over the middle of the note-hole. A note-hole that is not equal in size to the diameter of the flute has the effect that the air-column below the note-holes is retarding and slackening the tone, which therefore appears to be lower, despite the note-holes, than in flutes that are cut off over the middle of the note-hole. Hence if we cut off the flute below the note-hole, the note becomes higher than the note of the entire flute with the large note-hole in the middle. If, however, we cut off the flute over the note-hole of the diameter (or cut it off from the diameter over the note-hole) the note becomes lower than the flute with the larger note-hole in the middle; if we cut off the flute through the middle of the sound-hole, the note becomes somewhat higher than that of the entire flute with the big side-hole in the middle.

This retarding effect of the air-column below the sound-hole can be rendered imperceptible, according to Böhm's experiments, by making the diameter of the sound-hole at least three-quarters of the diameter of the flute. Sound-holes of that size cannot, however, be made in wooden flutes, the thickness of the wood influencing the depth of the tone.

The practical size of the sound-hole, and the possibility of closing and covering it, proved to be 13.5 millimetres in the silver flute, and 13 millimetres in the

wooden one, on account of the thickness of the wood; the silver flute in *g*, the so-called alto flute, was 21 millimetres in diameter. These large sound-holes can no longer be covered by the fingers. Böhm therefore made over every sound-hole a key closing the hole, and the fingers of the player thus bore not on the sound-hole itself but on the key closing the hole. This rational and ingenious key mechanism renders the playing much more agreeable and more sure than on the old flute, on which the finger had to close tightly the sound-hole; now it bears only on the key. Yet this improvement, apparently so easy, proved to be very difficult to bring about. Experiments were carried on for months to find a material fit for the pad of the key, in order that the lightest touch on the key should close the sound-hole air-tight. The material now used is of very good wool cloth, in a double layer of films taken from the amnion of certain mammalia.³⁸

³⁸ The most desirable size for the finger-holes is still a *quæstio vexata* amongst English flute-players. When the cylindrical flute was first introduced in this country, the holes were so small that they were closed with the fingers, the instrument being constructed with rings like the cone flute. Before the end of 1847 Boehm had increased the size of the holes so much, that it became necessary to substitute valves for the rings, the holes being too large for the unaided finger to cover. In 1862, when the patent for the cylinder had expired, Mr. Clinton began to make cylindrical flutes. He had previously declared that if the cylinder was right, Nature herself must be wrong; but he now came to the opinion that the cylinder could be brought into harmony with Nature by causing the holes to diminish in size from below upwards. Accordingly, he brought forward a flute with the holes graduated from the lowest, C #, which was nearly as large as the bore, to that for C ♯², which was about half the size. Mr. Clinton, however, was not successful as a manufacturer of cylindrical flutes. In the year 1864 Messrs. Rudall & Co. began to make Mr. Rockstro's model, on which the holes were very much larger than those previously in use, but instead of being graduated, as on Mr. Clinton's flute, were of uniform diameter. Exception, however, was taken by some players to these holes. It was urged against them, amongst other objections, that they necessitated a larger expendi-

The new key mechanism is a marvellous masterpiece of mechanics. The ten sound-holes, with ten keys,

ture of breath, and that the intonation had a tendency to become "wild," or unmanageable, so that greater strength of lip was required to control it. In deference to such allegations, holes of a size intermediate between these large holes and the comparatively small-sized holes previously in use were introduced. They were called the medium holes. For many years Messrs. Rudall's flutes were made either with the large or medium holes, the small-sized holes having fallen into disuse. Of late, however, some of the leading English players, professional as well as amateur, considering even the medium holes to be too large, are playing on instruments with holes but little larger than those which had dropped out of use, so that at the present time (1896) Messrs. Rudall & Co. are manufacturing flutes with holes of three different sizes : the large holes with a diameter of 15·3 millimetres, the medium holes of 14·3, and the small holes of 13·5. Each size has its admirers, but which of the three is destined to become the favourite, time alone can show. The determining influence will probably be the fashion set by the leading players of the day.

An excellent flute can be made with holes of so small a diameter as 12 millimetres. The harmonics and certain fingerings of high notes are not so free, it is true, as on flutes with holes of larger size, but, on the other hand, in its tone there is an unmistakable approach to the mellow, tender, plaintive, sympathetic quality for which the old flute was so remarkable, a quality the advocates of that instrument maintain was destroyed by Boehm. Tastes differ. For one, the more flute-like effect of the small-holed flute, its greater certainty in striking distant intervals from above downwards, and the thrilling power of the high notes will seem to have a priceless charm ; another will set a higher value on the pure, pale, chaste *timbre* of the large holes ; whilst an unprejudiced player will not withhold his admiration from flutes made with holes of either size.

Boehm made experiments with holes of different sizes, but never, even at the end of his life, satisfied himself as to the exact diameter which combined the greatest number of advantages. In his pamphlet of 1847 he expresses the opinion that the holes should be as large as possible ; but in 1866, in reply to a correspondent who had asked why the holes should not be as large as the bore, he wrote that to attempt to make the holes as large as the bore would be to betray "a want of taste and feeling for real musical tone." He objected to holes of an extreme size, on account of the large space taken up by the chamber in the tube caused by the hole, or

would require ten fingers; the flute-player, however, can dispose only of eight fingers for the ten keys. In the natural position of the eight fingers on the flute-tubes, the sounds \bar{g} and \bar{b} remain free. These two free keys are connected by means of a highly ingenious mechanism with the other keys, in such a manner as to be brought into motion by some other key of the flute. The \bar{g} key was so coupled with the \bar{e} , \bar{f} , and $\bar{f}\sharp$ keys that it could be pressed down by any one of these keys. The B_b was connected directly with the free B key and $F\sharp$ key.

This marvellous coupling Böhm had effected by changing the horizontal axis of his ring-keyed flute into a real joint (*charnière*); he pushed another tube or several small tubes over the axis, soldering to them the key-lever, so that on the same axis several keys closed or opened according to the wants of the player. The coupling on the \bar{g} -key is effected by a stirrup (clutch) consisting of two parts. The coupling of the \bar{e} , \bar{f} , $\bar{f}\sharp$ and \bar{b} keys is effected by little movable screws with the point of the screw bearing on the knob (nose) of the underlying axis; nay, it is quite a task to comprehend the interlacing of the keys on the flute itself.³⁹

the "hollow room" as he termed it. "It is a *defect* in the bore," he remarked, "which is repeated twelve times, as there are twelve holes." Referring to holes of 17 millimetres in diameter, two millimetres only less than the bore, he said that the tone was certainly louder, but that its quality was impaired. He mentioned that he had constructed for himself a flute with holes 15 millimetres in diameter, one millimetre larger than the holes he usually made. He describes the tone as louder, but not so sonorous.—C. W.

³⁹ The Doctor is as firmly convinced that Boehm was incapable of taking ideas from others as is Mr. Rockstro that he was incapable of constructing the flute called after him without having Gordon's instrument before his eyes. He has already (p. 417) attributed one of Buffet's inventions, the needle springs, to his friend, and he here credits him with two others, the clutches and the sleeves.

The second improvement, that of the cover-keyed flute, dates, as we have seen, from 1851. Böhm sent the first silver flute of that kind, together with an alto flute of silver and an oboe, to the first great Industrial Exhibition in London.

SPREAD, RECOGNITION AND USE OF THE SAME.

The ring-key flute had already been received, in England, for instance, with great enthusiasm. The English newspapers, such as the 'Musical World,' the 'Morning Post,' the 'Connoisseur,' the 'Manchester Guardian,' expressed great admiration for Böhm's flute; and the enthusiasm for the last cylindrical flute was still greater. Giulio Briccialdi, probably the greatest flute-player of his time, soon discarded his old flute, and after four weeks' practice on Böhm's flute, was received with enormous applause by an audience. He added an improvement to Böhm's flute, namely a closed⁴⁰ *b* key, although Böhm had made a *b* lever, in addition to the *c* key, which satisfied all that the player could desire.

Messrs. Rudall & Rose in their list of prices charge 26*l.* 8*s.* for a Böhm silver flute; for the *b* key of Briccialdi they charge an additional 1*l.* 1*s.*

Already in the year 1850, August 20th, an order for a silver cylindrical flute had come from Cannanore, East India; the receipt for it went by Madras, and arrived in Augsburg on October 26th, 1851, the flute itself having been on the route for one year and four days. It was ordered by Frohnert, orchestral conductor, who wrote Böhm, that having made the acquaintance of an officer of the East India Company, Prescott, who had frequently played duets with Böhm while in London, he saw one of Böhm's ring-key flutes, made by Rudall and Rose. Amongst many letters from all countries of Europe,

⁴⁰ The Briccialdi key is not a closed key, but a lever for closing the *B* key with the left thumb.—C. W.

there is one from Shanghai (China) O.S.O., dated December 22nd, 1866; it lies before me. It contains an order from Remusat, the celebrated flute-player to the Queen of England; he had seen one of Böhm's cylindrical alto flutes at Broadwood's in London, and desired to have one made of German silver. He was determined to give up his old flute, on which he had been playing for thirty years, for Böhm's flute. Hermann Miller, in Leipsic, wrote a poem of three stanzas on Theobald Böhm's exquisite silver flute, May 30th, 1850. W. Scherrer, the celebrated flute-player in Königsberg, wrote Böhm, October 12th, 1849, an enthusiastic letter, in which he says, "Bravo, bravissimo! my dear Böhm, and let me assure you that this exquisite flute surpasses all the expectations I ever entertained concerning the improvement of this incomparable instrument. Long ago I tried to arrange the classical sonatas of Beethoven for the flute; many amongst them, however, presented enormous difficulties, but now the last of the difficulties has vanished, and a perfect world of Beethoven music is my own, from the time I possess the flute, the purity and uniformity of tone of which are so great that not a shadow of a note need be sacrificed. In order to enjoy all the excellence of your unsurpassable master-invention, in an adagio with piano accompaniment, pray play with a clever pianist Beethoven's sonata op. 96 and its two adagios. I also recommend you the sonatas op. 23, 24, 30 (No. 1, 2, 3) on account of their exquisite adagios. I could also procure you my arrangement of three of Bach's sonatas, composed for piano and violin. Not only the dolces and andantes of these sonatas sound beautiful on your new flute, but also the allegros and prestos, all very learnedly built up in fuge form which could not have been executed on the old flute, somewhat better on your improved flute of 1832, on your latest metal flute, however, everything can be brought out with brilliancy," &c.

Letters to the same effect are before me, from England, America, East India, Russia, Odessa, Mannheim, Wiesbaden, Zurich.

Even in St. Petersburg, Antoine Sauvlet, first flute of the Imperial theatres, dedicated to Böhm, "the celebrated inventor of the new system of flutes," a "Souvenir du Volga," a "fantaisie caractéristique" (morceau de salon) for the flute with piano accompaniment.

The composer of that piece understood very well how to turn to account the peculiarity of Böhm's flute. His fantasia commences in F minor, a key in which no one had previously dared to play on the flute. It is a simple melody, advancing from *meno mosso* to *animato*; and moving through *a* \flat major in the middle register of the flute, in a cantilene full of melancholy, it descends to \bar{a} in a more cheerful mood, modulating afterwards through C major and F major. The musical idea is carried on by brisk triplets, and in *diminuendos* and *rallentandos* through D minor, B major, E minor, C \sharp major, F \sharp major, G \sharp major, returning through E minor to the first movement in F minor, changing after the seventh bar into F, through D minor and A major. The subject changes into a rollicking *allegro*, the piano responding in chattering triplets until the flute, in *tempo primo*, coquetting with the piano, reaches the original F minor. After a temporary descent of the melody into F major, in the old three-beat rhythm of the introduction, a jubilant *allegro vivo* leads the song on to its conclusion.

The power of the Böhm flute was most conclusively proved in the few bars of that musical composition.

BOHŔM'S REFUTATION OF THE ERROR INTRODUCED BY CHLADNI, THAT THE MATERIAL OF THE INSTRUMENT IS WITHOUT ANY INFLUENCE ON THE TONE.

Böhm, as we have seen, made during that period a very interesting step towards the refutation of an error

rife amongst acousticians, an error that had been brought into the world by Chladni, and being credulously accepted, was spreading everywhere, and finally figured as a scientific dogma in the text-books. Chladni asserted that the material of which an instrument was made had no, or very little influence on its tone-colour. Nowadays it is taught, as an advanced result of acoustical investigations, that the material of a wind instrument has no influence on the tone. "A flute made of glass, &c., sounds like one made of wood." Even if this statement is only a theoretical development, we are bound to say that the person who actually compared a glass flute with a wooden one must have lacked the least aptitude for music. Already in his 'On the Construction of Flutes' (1847), p. 16, Böhm had said, "Flutes were also made of ivory, Laurent in Paris made flutes of crystal glass, in Nuremberg a flute was made of papier-maché, in Berlin one for Frederick the Great, of porcelain, and Döngler at Munich made flutes even of wax." The poorest tone was of course that of flutes of the last kind.

Böhm had used drawn brass tubes, these being readily procurable and easily manageable. The exceedingly easy production of tone in these brass tubes surprised him, and thus, after having made the ring-keys, he constructed first a tube of brass, then of silver, German silver, &c. Regarding this he says in his last work, 'The Flute, its Construction and Handling,' p. 9: "On the colour of the tone the greater or lesser hardness and brittleness of the material exerts the greatest influence. There are numerous experiences with regard to that, for there are flutes of ivory, crystal glass, china, india-rubber, papier-maché, nay even of wax. All these experiments caused the manufacturers to go back to the use of very hard wood, until I succeeded in making flutes of silver, and German silver, which have competed with the wooden flute these twenty years (this he said in 1871), without anybody being able to decide which of the two is the

better. The silver flutes are, on account of their great aptitude for modulation and their bright and sonorous tones, especially fitted for large halls. Since, however, the tone-production is, in a measure, too easy, thus leading the player too frequently to over blow, thus producing hard and screaming notes, the advantages of the silver flute can be availed of only by him who has studied it most carefully. For this reason wooden flutes are being made according to my system, these answering the purposes of most flute-players somewhat better, and they also are preferred in Germany on account of their full and agreeable sound. In England, however, the silver flute is carrying the day almost exclusively."

Thus Rudall and Rose write, September 2nd, "There is not the slightest doubt about your metal flute being greatly superior to every other. Indeed, it is believed that there is no other wind instrument that combines so many advantages." And the flute-virtuoso George Rudall writes at the same time, "I have played at numerous reunions, and your metal flute has caused universal admiration and enthusiasm. All exclaimed, 'It surpasses our ideas how the flute could be brought to such perfection.'" There are dozens of letters from all countries expressing admiration for the metal flute.

Then came the great Industrial Exhibition of All Nations in London; it was the first and the grandest in its way in London, and also with regard to the participation of all nations of the globe. Of the musical instruments exhibited the flutes alone interest us. Among the most interesting instruments of the exhibition we class a new silver flute by Böhm, with covered keys; furthermore a piccolo and an oboe on the same system.

Rudall and Rose, the oldest and most celebrated flute manufacturers of England, also exhibited flutes on Böhm's system, and received the prize medal for these flutes. There was also the improved patent flute of the celebrated flute-player Carte, then the patent flute of the

celebrated flute-player Clinton. He, too, availed himself of the Böhm arrangement of the finger-holes; however, he attempted to retain the old fingering by means of a peculiar mechanism.

There were of course flutes from various countries. From France there was Godefroy with the Böhm flute; Berton from Paris had also brought a flute on Böhm's system. There was also Tulou with his so-called improved Böhm flute.⁴¹ From North America

⁴¹ Tulou's improved flute was a flute on the old system, with closed keys and very small holes, as shown in the engraving, which is taken from his *Method*. In addition to the two shake keys at the top, there was a second middle C key with a hole of its own, and a key for F \sharp , to sharpen this note when it was shaken with G. The fingering is given in his *Method* (second edition, p. 61).

Tulou was violently opposed to the Boehm system on the twofold ground that the simplicity of the old fingering was abolished, whilst the enlargement of the holes destroyed the charm of the instrument by converting its liquid sweetness into a dry and reedy tone like that of the haut-boy. When I showed him the Siccamo flute on which I played, as a young man, during my residence in Paris, he at once objected to the large size of the holes, and exclaimed, repeating the words with vehemence, "Je n'aime pas le système!" So conservative was he that he preferred



Fig. 45.—Tulou's Improved Flute.

there was Pfaff of Philadelphia. There were flutes from the Zollverein, from Essen, Neukirchen, Klingenthal, Mainz, and from Switzerland and Denmark.

The jury of the Exhibition were:—Sir H. Dr. Bishop, professor of music in the University of Oxford, president; Sterndale Bennet, professor of the Royal Academy of Music in London; Hector Berlioz, from France; Dr. Robert Black, from the United States of America; Ritter Sigismund Neukomm, from Germany; Cyprian Potter, President of the Royal Academy of Music; then myself, Böhm's biographer, and also as juror of the *Vereinsland*; then Sir George Smart, organist and composer for the Chapel Royal; Sigismund Thalberg; Dr. Henry Wilde, Professor of the Royal Academy of Music.

Böhm's flute caused the greatest sensation, exciting the greatest interest amongst all musicians, and receiving finally, after the most careful examination of every single detail, unanimously, the first prize, the great prize medal. (See 'Official Report on the Industrial Exhibition of All Nations in London in 1851, by the Report-committee of the Governments of the German Zollverein,' vol. i. p. 882, and pp. 934-935).

Böhm's flute was manufactured in most countries, but chiefly in North America; however, the flutes made in Böhm and Mendler's factory in Munich have never been equalled. The best Böhm flutes in London were made by Rudall and Rose, in Paris by Godefroy and Lot, whence they spread all over the world.

A grand imitation of the London Industrial Exhibition was arranged in Paris in 1855. In addition to his silver flute Böhm sent to that exhibition a wooden flute and

flutes without the long keys in the foot, indeed his favourite instrument was the four-keyed flute. He once took me to the Conservatoire, where we found his pupils playing trios on flutes with only one key in the foot.—C. W.

models, calculations, and designs, and a method of determining the measures and proportions of flutes of all pitches, in a mechanical or graphical way. In Paris, and therefore in France, Böhm's flute had become musically common property. The jury accorded him unanimously the first prize, namely the gold medal of honour, and the president of the Paris Exhibition committee, Prince Napoleon Bonaparte, expressed his particular admiration of Böhm's invention. A reporter says, "His Royal Highness terminated his eighteenth visit at the twenty-seventh class, Instruments of Music, and declared, 'If France, occupying as she incontestably does the first rank in the manufacture of musical instruments, were to dread a competitor, it would be Bavaria with its wood wind instruments. In that class foreign countries had one name only to oppose to France, but that name is an *authority* and a *power*; we refer to M. Böhm, of Munich. As an artiste, as an inventor, and as a manufacturer, M. Böhm has carried every branch of his art to the highest perfection. He has given his name to a new system applied to the flute. He has sent two models to the Exhibition, one of metal, the other of wood, which have secured for him the great medal of honour.'" (See 'Visite de S.A.I. le Prince Napoléon aux produits collectifs des nations qui ont pris part à l'Exposition de 1855.')

The prince then declared, with fullest admiration, "His name is an authority and a power."

The report of the president of the French jury, director Joseph Helmesberger of the Vienna Conservatory of Music, is to the same effect, Helmesberger expressing himself also as a German, "The author of these lines cannot refrain from saying, in concluding his report on the XXVIIth Class, that German ingenuity, as displayed at the Paris Exhibition, is to be congratulated chiefly for the manufacture of wood wind instruments. We most heartily recognise here a German as the reformer of the flute, our celebrated master Böhm

of Munich, who has been unanimously accorded the great medal of honour. The excellent, nay inestimable system of the ingenious artiste, which will no doubt be applied to other wind instruments besides the flute, must be regarded as a real advance in the construction of musical instruments, and will no doubt meet with general acceptance. May the esteemed master find full recompense for the slowness with which his invention has been spreading, in the well-merited recognition accorded him in the Exhibitions of London, Munich, and now also in Paris, as well as in the conviction that he has acquired a lasting and excellent name in the history of the development of musical instruments !”

All this remained on paper, and not one musician out of a thousand read it. That which produced so great an effect on the musicians of France and North America, nay even on the Paris Academy, had no existence for musical Germany. Even at the Industrial Exhibition at Vienna in 1873, the conviction was general that the future belonged to Böhm's flute. “The present has long been Böhm's, all over France, England, Belgium, and to a great extent Germany, Italy, and America. With us people cling faithfully to Ziegler's flute ; it is to his and to his father's credit that in Vienna the old Vienna flute is still reigning supreme.”⁴² (See ‘Internationale Ausstellungs-Zeitung. Beilage der Wiener Neuen Presse. Wien, Donnerstag den 21. August 1873, No. 3231, Feuilleton.’) However, a great number of Böhm flutes from Böhm's factory have been sent to Vienna and all parts of Austria, especially for the use of amateurs.

⁴² The partiality for Ziegler's flutes is not confined to Vienna. Whilst preparing this work for the press (May 1892) I heard a young lady, a professional flautist brought up in England, play Briccialdi's capriccio on a flute by Ziegler (the father) at a private concert in London. She informed me that she had one of Rudall's latest cylinders, but that she greatly preferred the Ziegler on account of the superiority of its tone.—C. W.

From this time forward there was no factory of musical instruments in France, in which Böhm's flute had not its allotted place among the instruments manufactured. Besides the old celebrated factory price of Godefroy and Lot, we find in Paris, for instance, Desnoyers, Thulart, & Co., offering Böhm flutes at 140 francs, German silver 90 francs, "petite flûte de Boehm grendille 90 francs, German silver 60 francs," Böhm clarinets, "new system," 245 francs, and up to the present time at 140, 135, and 130 francs. Even in Cuture and Jury-la-Bataille, both being villages in the Department d'Eure, north-west of Paris, the instrument-makers Thibouville and Hérouard have on their price list a Böhm flute with eleven keys, and Messrs. Noblet and Thibouville in Jury-la-Bataille on the Eure have clarinets on the Böhm system, ranging from 160 to 200 francs, and Böhm flutes at 150, and of German silver at 95 marks.

The most celebrated and excellent factory for Böhm's flutes in England was that of the old firm of Rudall and Rose in London. The factory acquired a patent, and sold Böhm flutes, in cases with all requisite appurtenances, of cocus wood with silver keys at 18*l.* 18*s.*; cylindrical flutes of silver at 26*l.* 5*s.*; of German silver silver-plated at 18*l.* 18*s.* For a closed *g*[#] key, or for a Bricerol *b* minor (Briccialdi *b*) key, an additional 1*l.* 1*s.* was charged.

The most extensive manufacture of Böhm flutes, however, is to be found in North America. Thousands of musicians (amongst them the very best) play on the newly improved Böhm flute. Through them the flute has become a highly esteemed instrument; in England, France, and Belgium, the Böhm flute is being used exclusively.

BOEHM'S IMPROVEMENTS IN THE OBOE. HIS ALTO FLUTE.

Böhm finally applied his system to all wood wind-instruments with finger-holes. Thus he made an oboe

for Lavigne, the first oboist of the Italian Opera in London; a bassoon for the first bassonist of the Italian Opera in Paris, both according to his system. These instruments, too, were also received with great approval, despite their high price and new fingering. The celebrated manufacturers Triebert & Co. made oboes on Böhm's system. According to a price list dated March 7th, 1857, such an oboe, descending to "a," with silver keys, in a case, costs 600 francs.

One of Böhm's new creations is his alto flute (in the London Exhibition it was still called "flûte d'amour"). He had added the so-called B-foot to his flute; lower down he would not go, the lower tone losing all richness.

In time he overcame this obstacle also. As early as 1847 he made tubes which produced the low *f* with the same ease and richness as the higher tones; the fingering, however, the key-holes being wider apart on the longer G flute, became more difficult, and the fingers were soon tired out by the great tension. Böhm therefore stopped at the low *g*. Such a flute is, despite its length, still easily manageable. The G flute has a length of 820 millimetres, and its bore is 26 mm. wide, while the C flute, Paris pitch, is 620 mm. long, and the bore 19 mm. wide. The lower finger-holes are 21 mm. in diameter. Böhm called his flute rightly an alto flute. The fingering is the same as that on Böhm's *c* flute. The seven notes next to the fundamental note G are easily produced, just as on the Böhm flute in *c*, without offering any difficulty to the player. Moreover these low sounds are of marvellous beauty, and can be swelled to a surprising volume, thus rendering the alto fit to be used in the largest halls as well as in drawing-rooms.

From that time onward Böhm gave up travelling and occupied himself chiefly with giving instruction. In his leisure moments he composed for his instrument, and

his compositions were received with great favour all over the world, especially in North America.

The improvement of the flute, however, he never lost sight of. By substituting a headpiece of cocus-wood in lieu of the old metal one, the old man of seventy-eight considered the task of his life completed. Through this headpiece the metal flute obtained even in the highest notes the characteristic mellowness of the flute tone, without losing the ease of the tone production and the brilliant vigour of the metal flute.

CARTE IN LONDON. BÖHM'S OPINION OF THE IMPROVEMENTS MADE ON HIS FLUTE.

As already mentioned, the new flute was improved here and there; the essential nature of Böhm's invention, however, namely, the dimensions of the tube, the position of the key-holes at their acoustical places, were never altered in the least. It was invariably a secondary portion of Böhm's flute, such as the position of a key, occasionally the addition of a new key, or the addition of a closed one instead of an open one, that were made, partly as a hobby, or for some special fingering, often from an itching for adding something novel as an improvement to the celebrated instrument. This was done by the great flute-players Coche and Dorus; also by Giulio Briccialdi, who was undoubtedly the greatest of all flute virtuosì.

The whole innovation turned, properly speaking, on the improvement of the so-called *g*[#] key. Böhm kept all keys open, and consequently all the fingers were performing the same movement, viz. that of pressing down the keys. Böhm's flute is always manufactured with this so-called improvement in France. It was R. Carte, England's greatest flute-player, who had a patent for an improved flute himself, who adopted Böhm's flute with ardour, and also assimilated Böhm's

system more thoroughly than any one of his colleagues. He wrote a work which reached several editions, entitled, 'A complete Course of Instructions for the Böhm Flute' (both the open and the closed G-keyed flute), designed as well for beginners, as for those acquainted with the old flute; and preceded by an analysis of the Böhm flute and the old eight-keyed flute. With a comparison between them to enable the flute-players to judge of their relative merits. By R. Carte. London, Addison and Hodson, 210, Regent Street, and 47, King William Street. Price 10 shillings 6 pence. 1846.' (Of the first edition of 1845 I have spoken above.)

This analysis went into the details of the Böhm flute and the old eight-keyed flute, comparing them with one another so as to enable the flute-player to judge of their relative merits. It is probably the best work ever written on the Böhm flute; the analysis of the Böhm flute is also unique. In that analysis he defends Böhm's key mechanism as the only uniform key- and fingering-system. He says very pertinently, "With the closed $g\sharp$ key the fingers have to perform a double movement. How irrational is a system arising from the uncouth fingering of the old flute, where some fingers must be lifted over, others again pressed down on the keys. In the second octave this fingering becomes still more complicated, and can be only excused in him who can in no wise wean himself from the old habit."

Böhm says, "If it were possible to make a key for this $g\sharp$, without throwing confusion into the whole system of fingering, I should not say a word against it; this, however, not being feasible, and since the beginner can without the slightest difficulty accustom himself to the open $g\sharp$ key, and since the player of the old flute can easily get familiar with my system, I will never approve of the closed $g\sharp$ key. I would advise everybody to study my system without any alterations, and I am convinced that players will be glad to have adopted

my advice. French flute-players who used the closed *g*[#] key will never reach the perfection of German players that have followed my system any length of time, for instance, Stettmair at Hechingen."

Compare the design of the key system of Böhm's flute with that of the two old flutes on the same table. The impression is at the first blush a favourable one. In his key system there is a harmony that strikes everybody at the first glance, furnishing the proof of that key system's having arisen not from mere accident or individual want, but from one single rational principle. But let us hear Böhm himself:—

"I have altered nothing in my key-system, for it has been proved, first, that the most eminent artists were able to execute to perfection all musical combinations, without regard to the key in which they were written, on my instruments as I had made them; and secondly, because, despite all efforts on the part of others, nothing superior to my own invention has as yet been produced. For, even granting that some of the difficulties of my flute have been removed by the so-called 'improvements' in my key-system, the advantages obtained thereby are only apparent, consisting as they do in a shifting of the difficulty from one finger to another,⁴³ or from one place to another, real facilities having been obtained only at the expense of the equality and purity of tone.

"I do not deny that a greater facility in the handling of the instrument, and more than anything else, a less complicated key-mechanism are highly desirable; but as long as only *nine* fingers will be at the disposal of the

⁴³ This statement is not strictly correct. The improvements referred to do more than shift difficulties from one place to another. They enable a player to evade, avoid, or circumvent difficulties by giving him a choice of fingerings, thus adding to the resources of the instrument. It is perfectly true, however, that these advantages are purchased at the expense of increased complexity of mechanism.—C. W.

player for the opening and closing of the *thirteen* sound-holes, all of which are unavoidably necessary for the production of a pure and equal chromatic scale, difficulties will be inevitable. For, either one finger will have to serve for several holes at various places, whereby the playing is rendered more difficult ; or the keys of several holes must be, for greater facility's sake, reduced to one by means of combinations, whereby the mechanism gets more complicated.

“Clever workmen, however, will make even a very complicated key-mechanism in a solid and satisfactory manner, and technical difficulties for the player can be overcome by diligent practice, considering that all other orchestral wind instruments are technically much more difficult than the flute. Tone and purity of scale are the most important features of a musical instrument, since without them the player will never reach perfection of execution.

“My flutes possess a compass of three octaves or thirty-six tones, by means of which one can execute with purity and certainty all chromatic scales, all interval-combinations, trills, &c., from c^1 to c^4 .”

STRUCTURE AND SIGNIFICANCE OF THE BÖHM FLUTE.

RELATION OF THE THEORY OF ACOUSTICS TO ITS PRACTICE AS ILLUSTRATED BY THE BÖHM FLUTE.

The Böhm flute is in reality a perfect and consummate musical instrument, and it is all the more noteworthy in the history of musical instruments, because we can trace its rational completion, based on acoustical rules, to all its details, from beginning to end.

This flute has arisen out of the constant study of the theory of sound. The theory of musical instruments with finger-holes is classed amongst the most difficult of acoustical problems. The scale of the flute is produced

under such peculiar circumstances and in the teeth of so many disturbing elements, that hardly any other instrument can be compared to it. The flute has a great resemblance to an organ-pipe; however, an organ-pipe gives only one note, whereas the flute has to give the whole scale. The laws according to which the scale is produced on a monochord, are generally, but wrongly applied to instruments with side-holes.

If we divide the sounding string of a monochord, by means of a bridge, into two equal parts, without altering the tension of the string, each half gives the octave of the note of the entire string. With organ-pipes this is the case under peculiar circumstances only. By cutting off one-half of an organ-pipe, one would think that we should get the octave of the entire pipe. The two halves, however, are not equal; the upper part is a tube open at both ends, or a prism of the same nature; the lower part being closed at the lower end, with the exception of the opening at the side. It is therefore not to be expected that the lower part will give the octave of the entire pipe; and practice corroborates the assumption that the lower half of the pipe will give a lower tone than the upper half.

However, the flute is not an organ-pipe. Calculation and theory have here to deal with a dozen influences and modifications, of which there is no trace in the analysis of the organ-pipe. We blow the flute, which is closed by a cork, sideways, through the embouchure, which is at a distance of 17 millimetres from the cork. There are, moreover, side-holes, or the so-called finger-holes.

If a finger-hole could be made equal to the diameter of the flute, the note of the instrument would respond to that of a flute that is cut off a little below the middle of the hole; however, the finger-holes cannot be made so large as that, therefore the vibrations of the entire air-columns are disturbed by intruding negative air-columns, the effect of which depends on the size, the number, and

the distances of the holes from the lower cylindrical part of the flute.

The function of these side-holes as affecting the number of vibrations, forms a very complicated mechanical problem. There are differential equations that cannot be integrated, and integration between limited integrals leads to results that come very near to reality, but have not reached it as yet ; for all hinges on a few vibrations which the ear can well judge of. I frequently brought Böhm the results of long calculations ; but whenever he constructed a flute according to my formulæ, there always were a few vibrations in excess or defect. *Empirical formulæ alone can help here.* For, as we have already remarked, the flute is no organ-pipe. The organ-pipe, when it stands with its mouthpiece on the pipe-board, is always being blown into through the same mouthpiece. In the flute there are many other concurrent influences to be considered. The characteristic tone-production is made by the lips. The flute when in contact with the lips, sounds a little deeper than the free flute blown into through a mouthpiece, the lips overlapping the embouchure. The position of the lips is always varying, and it is this constant variation that produces the peculiar character of the tone. If the player turns the flute a little inwards, then the upper [lower ?] lip covers more of the embouchure, and thus the tone becomes deeper ; if he turns the flute outwards, the tone will be somewhat higher, or will bound up to the octave. It is precisely in the flute that the play of the lips makes the soul of the tone ; and this influence of the lips baffles all calculation.

Theory alone, therefore, could not have produced the new flute.

It was, moreover, necessary that a musical mechanic, as gifted, persevering, and ingenious as Böhm, should set the practical limits to which theory can approach without ever reaching.

The third reason why Böhm's flute became such a thoroughly musical instrument that it found favour with the whole musical world, was the fact that Böhm himself was a virtuoso, nay, one of the most excellent virtuosos who have composed for or played on the flute. In his capacity as a virtuoso he was able to see by what contrivances the exigencies of art could be met. Such a man alone was able to combine the results of theory and practice in such a manner as to answer the highest purposes of Art. And, finally, had Böhm not been the excellent virtuoso he was, he could not have proved the superiority of his flute as conclusively as he did, and could not have prevailed upon flute virtuosos to lay aside their old flute and to recommence their studies in order that they might master the new instrument. If Böhm had not been able to convince the musical world personally of the excellence of his flute, his invention would never have been approved of, for the ordinary artists of the old flute—for instance, in Germany—not only ignored the new flute, but actually opposed its introduction. Böhm's flute has now been played in all civilised countries for thirty years; in Germany, however, a Böhm flute can be found only in the hands of a few amateurs and in the Court orchestra at Munich.

While theory may penetrate, by measurement and calculation, into the inner essence of the phenomena of motion, evolving for instance, the laws of sound-vibrations, it will be only by one who is at once an ingenious mechanic and a virtuoso that the results of theory will be effectually turned to account in the construction of a real practical instrument, to the completion of which, without these qualities of the virtuoso, centuries might have been required.

The same holds good regarding the Violin.

All our acoustical experiments, all our theories are good for the lecture-room, for people who are no musicians. The artist, the virtuoso alone can pronounce

on the value of a musical instrument. One might object, that the *violin* has arisen without the aid of theory. It is true that the violin did not originate in the theories of the learned, but was made by the experience of simple and ingenious virtuosi, gifted with mechanical talents, who, although their names did not shine in periodicals, worked unremittingly with head and hand until their instrument answered all the wants of the artist. The celebrated makers of violins, up to Steiner, were all violin virtuosi; Steiner, after having spent the week in carving out his violins, played on his instrument, every Sunday, in the Orchestral Society at Innsbruck. The violin would have most assuredly been spoilt had Science taken up its manufacture, and here we are reminded of Schiller's *Philosophers*, of whom he says:—

“ From the union of Genius with Heart
Spurring inventions ne'er dreamt of by Locke or Descartes.”

The old violin-maker, who was at the same time a violin virtuoso, prompted by a correct insight, of which our modern acousticians do not possess an idea, changed centuries ago the flat sounding-board of all keyed and stringed instruments, played by the fingers or by a plectrum, such as the theorbo, lute, mandoline, zither, into the arched back and belly of the violin; whereas one of the greatest acousticians of modern times has actually denied the efficacy of this arching, whilst it is the sole cause of the peculiar character of the violin. Our violins were not made in the laboratories of our theoretical physicists; nay, centuries were necessary before these theoretical savants could understand the efficacy of the violin construction.

WARD IN LONDON AS BÖHM'S OPPONENT.

There was, speaking generally, only one opponent of Böhm's flute who appeared in public, and even he did so from ignorance of the effects of that instrument. This

was, as already said, Cornelius Ward, instrument maker in London, who offered the public a flute of his own invention. (See 'The Flute Explained, being an Examination of the Principles of its Structure and Action. By Cornelius Ward. London, published by the Author, 1844.')

Ward was pretty familiar with the history of the flute and with the acoustical principles underlying its structure; he had gathered his information from Carte's pamphlet and procedure. He knew the faults of the old flute, and it was he, as we have seen, who in 1831 carried out the ideas of Gordon regarding the improvement of the flute. He holds that Böhm placed the holes pretty fairly; he falls foul, however, of Böhm's fingering, and his very censure is a most cogent proof that he did not understand that fingering, and that he was no virtuoso. He calls Böhm's fingering untheoretical in the highest degree, and awkward; he says that it is hard to learn, and just as hard to put into practice. The tone of Böhm's flute, he adds, is unequal in force, varying in character, and bad in quality.⁴⁴

⁴⁴ The following is the passage in Ward's pamphlet to which the Doctor is referring:—"The Boehm flute is free from the first named objection to the old flute (its excessive deviation from the true position of the apertures). It is perforated with tolerable accuracy, but here its merits end. *It cannot be used* in accordance with its apparent design.

"It requires numerous closed holes, cross-fingerings, alternating action, cramped and unnatural application of the manual powers, and frequent employment of harmonics, &c. &c., with the necessary results of unequal power, varying character, and general inferiority in quality of tone. Its fingering, also, is in the highest degree immethodical, awkward, difficult both to learn and to apply, and deficient in many of the important requisites for skilful and refined performance." Ward then proceeds, as might be expected, to contrast the Boehm fingering with that of his own flute, the fingering of which, he informs his readers, "is systematic, regular, easy, and easily acquired. . . . There are no cross-fingerings, no alternating action, no contravention of the mechanics or anatomy of the human hand. . . . Any possible objections to the universal introduction of this instrument, can only be of very

One is astonished to hear such reproaches in the year 1844; for, of all that, the very reverse is true. Thus, Berton, a French composer, who was a member of the committee of French musicians who examined the Böhm flute, to Coche, the flute-player:—"You have deserved well of your colleagues by devoting yourself to the study and construction of the new instrument. Now it will be possible to employ the flute fearlessly in every scale without distinction, because it is *equal* in tone, perfect in intonation in all keys, and so improved in mechanism as to be free from all noise except such as may be heard in any other wind instrument, and capable of executing the compositions of your illustrious master Tulou, and all the trills of every register of your instrument. These advantages were more than sufficient to induce the Académie to sanction the report, of which you may feel proud." (See 'Examen critique de la flûte ordinaire comparée à la flûte de Boehm,' par F. Coche, Paris, 1838, pp. 19, 20.)

The meeting of the Académie took place on Saturday, March 24th, 1838, and six years after that Ward writes, that the tone of Böhm's flute is unequal in force, variable

temporary prevalence. . . . Our language may be considered strong and confident. But our strength lies in facts; our confidence in our conviction of the truth; and our justification in the concurrent testimony of *all* who have become acquainted with the instrument." After a panegyric in this style extending over a couple of closely printed pages, in bringing his pamphlet to a close, he writes: "Do not let us be deemed speaking in the language of hyperbole. We can point to several flutists who, with four weeks' practice on our instrument, have acquired a skill and proficiency, previously denied to the untiring industry of forty years. It has been our wish," he continues, "throughout this work to speak the truth, the whole truth, and nothing but the truth."

We are told by Mr. Rockstro that Ward was Boehm's superior in every way, excepting in the matter of musical attainments; but this statement clearly requires to be qualified. There was an instrument, as a performer on which Boehm was immeasurably Ward's inferior—his own trumpet.—C. W.

in character, and poor in quality! Ward was no artist, but a manufacturer, and such misunderstandings are intelligible only from the standpoint of a jealous tradesman.

Ward talks of the difficulty of Böhm's fingering, and Carte, the celebrated flute-player, had written six years previously that beginners accustom themselves much more quickly to the fingering of Böhm's flute than to that of the old instrument.

At the Industrial Exhibition in London Ward exhibited his flute, which was partly constructed after Böhm's system; but it passed quite unnoticed, while the jury unanimously accorded Böhm the first great prize medal.

BÖHM'S PUPILS, HAINDL, FÜRSTENAU, AND KRÜGER.

Böhm had instructed many a pupil both on his old and his new flute. The greatest of them, a man who would have become a Paganini of the flute, was *Hans Haindl*, who stayed a short time in Vienna. He was the son of a tower-guard of Amberg, in the Bavarian Palatinate, and he returned from Vienna to Amberg to fetch his *fiancée*. Taking a boat-ride on the Vils he came too near the target of a shooting-gallery, and was killed by a bullet, and died in the arms of his *fiancée*. The target had only one small opening high up, and it is inconceivable how the bullet could hit the unfortunate young artist who was boating on the river.

Haindl had quickly procured a silver cylindrical flute in Vienna, and he wrote to Böhm, May 20th, 1848, "Heartly thanks for the exquisite flute. I like it immensely, and shall do it honour by my playing."

Haindl's wonderful effects were the cause of Fürstenau's sending his highly gifted son Moritz to Böhm, July 1845, in order that the latter might study the new flute. Fürstenau (Anton Bernhard) was the celebrated flute-player of the Court band of Saxony.

As early as November 10th, 1845, Fürstenau played in public Böhm's E \flat major Fantasia on Swiss themes at a concert of the Royal Bavarian musicians Faubel, Menter, and Mittermaier, scoring an extraordinary success. He returned to Dresden, where, in a celebrated concert of his, he created quite a sensation. In an account in the 'Dresdener Tageblatt,' we read, after the report of the concert, "The artist played on the so-called Böhm flute." The reporter gives a detailed description of that flute and its advantages over the flutes formerly in use, and concludes, "Herr Moritz Fürstenau, who proved an excellent artist some years ago, sacrificed the old fingering and devoted himself to the study of the new flute under the superintendence of the inventor, and he has shown in this concert that his praiseworthy resolution has led him to brilliant results. His tone in the lower register is exceedingly beautiful and sonorous, and in the high notes also it exhibits a remarkable richness."

In a report of the 'Wiener Musikalische Zeitung,' December 1846, we read, "The concert given by Herr L. M. Fürstenau, jun., on October 28th, was highly welcome to the musical world." Regarding the flute used at that concert, we read: "The worthy artist, a clever pupil of his celebrated father, has not shrunk from the gigantic task of recommencing the study of flute-playing *ab ovo*, on the newly invented flute, after having acquired a remarkable proficiency on the old flute. The invention has not yet met with due recognition in Germany. Fürstenau's industry and self-abnegation have been crowned with the most brilliant success, &c. The young virtuoso shows a consummate and finished technique, great *bravura* and force, and an agreeable tenderness in his style."

Although he was received with much applause abroad, his own country cared very little for him. The old members and the directors of the then Saxon Court band were so much opposed to the new flute, that

Moritz Fürstenau, who had been appointed February 1st, 1842, was obliged to return to the old flute in 1852, for fear of losing his appointment, and that at a time when all England, France, and America were revelling in the new flute!

Krüger, the Royal Württemberg Court musician, also sent his son Charles, in the autumn of 1846, to his friend Böhm in Munich, where Charles finished his studies during 1847-48. Young Krüger is at present one of the most excellent flute-virtuosi and chamber-virtuosi at the Royal Court of Württemberg.

These are some only of Böhm's best known pupils in Germany. His pupils count by the hundred; the best among them live in America, many of them are in England, who, whether amateurs or professionals, have become Böhm's intimate friends. Up to the last days of his life new pupils applied to him for instruction.

Amongst the amateurs there is a very original German physician, who passed the best years of his life in South America. He also has had the heroic resolution of giving up the old fingering, and acquiring that of Böhm's flute; he now plays Böhm's *c* and *g* flutes with almost unsurpassable excellence.

THE LAST YEARS OF BÖHM'S LIFE. HIS PRINCIPLES OF FLUTE-PLAYING.

Böhm spent his last years, having given up his travels on account of ill-health, in instructing gifted pupils, in carrying on a large correspondence regarding his flute, with people as far off as Australia, and in composing for both his instruments, the *c* and the *g* flute, or in arranging works he had originally written for the *c* flute, for his alto or *g* flute.

The little recreation he indulged in was a trip in autumn to the Tegernsee, the residence of Prince Charles, the second son of King Max I. King Max I., who was

also fond of staying at the chateau at Tegernsee, had always looked upon Böhm, as we have seen, as one of his favourite musicians, and his son Prince Charles extended to him the same favour. The richest of all the Bavarian princes had long before chosen Böhm's son Charles as his cashier, and was pleased to see the father at his chateau at Tegernsee.

It is hardly describable what a deep impression Prince Charles's death made on Böhm, who was at that time eighty-one years old, and to whom the Prince had bequeathed a beautiful souvenir. Despite all that, Böhm's physical and mental powers remained unbroken up to a very great age; finally there came signs of decay. He lost his two front teeth, which of course interfered very much with his flute-playing. However, clever mechanic as he was, he made two teeth of his own invention, and inserting them into his mouth by means of a very ingenious mechanism, he could play as well as he did thirty years before.⁴⁵

His wife died six years previously; his children were all amply provided for. He left Munich but rarely.

As we know, all his care in instructing his pupils was directed to render their reading perfect, he being himself unparalleled in the charm of his style. Hence, as was

⁴⁵ Although he retained his execution, he lost with his teeth his good embouchure. Writing to Mr. Mills in January 1874 or 1875 (the last figure is indistinct) he says, "As to your question about false teeth, I had lost two of my front teeth years ago, and since two years I had lost two more, but I can play still well enough, though I have no more that excellent embouchure I had in former times. The main thing is that the false teeth fit well, and do not give pain or molestation. In two months I begin my eighty-second year, and I play still on my flutes, only my eyes get very bad, as you can see by my miserable writing."

In a letter in German to Mr. Walter Broadwood, dated September 1st, 1868, he says, "I have made my own teeth, which I only use when I am blowing, at other times I carry them in my pocket. Playing with false teeth answers well enough, but my excellent tone-production of former years is gone for ever."—C. W.

said above, the astonishment of Lady Gresham, who once exclaimed, "It is marvellous! When Böhm plays the same piece, it sounds quite different from what it does in the hands of ordinary flute-players!"

In his work 'The Flute and Flute-playing, acoustically, technically, and artistically considered' (Munich, 1871), he says, page 20, under the heading "On Style," "He who, like myself, has been fortunate enough to have heard all the great singers of the last fifty years, will never forget the names of Brizzi, Sessi, Catalani, Velutti, Lablaché, Tamburini, Rubini, Malibran, Pasta, &c., remembering with delight their wonderful performances. They all got their instruction in the Italian school of singing, which to the present day is the foundation of a good voice-formation,⁴⁶ leading, as it does, to a correct reading and interpretation, of which the instrumentalist is just as much in need as is the singer, In order, for instance, to render an Adagio with all the necessary *coloratura*, the player must not only be a perfect master of his instrument, but also must acquire the power of changing his notes into words, as it were, by which he is able to express his sentiments. He must learn to sing on his instrument. One of the most effectual but also most difficult vocal ornaments is the shake, which is seldom to be heard well executed nowadays."

Böhm added to his work several songs, explaining at the same time how they are to be sung, and played on the flute; e. g. the air from the 'Zauberflöte,' "Dies Bildniss ist bezaubernd schön"; an air from one of Joseph Méhul's operas, 'Nur meine Kinder lass glücklich stets sein'; Schubert's songs, 'Der Lindenbaum,' 'Trockene Blumen,' 'Staendchen' ('Leise flehen meine Lieder'), 'Das Fischermädchen.' Finally he gives the *Rondo Larghetto* of the last *aria* of Donna Anna from

⁴⁶ Boehm expressed the opinion in conversation with me that the introduction of the Wagner style of opera would lead to the destruction of this school.—C. W.

Mozart's 'Don Giovanni' (No. 26). He says, "These few bars (53) contain as the most perfect example everything that has been said about rendering a musical composition, the *cantabile* and larghetto winding up with simple ornaments of runs and *mordentes*, and the allegro containing all kinds of shakes, and *roulades*, and hence all *colorature*."

ARRANGEMENTS AND LAST COMPOSITIONS.

This was the reason why, in his last days, he chose chiefly original songs and arias from the great masters, adapting them to the flute, and arranging them with an accompaniment for the piano or orchestra.

This led Böhm to resolve on recasting eighteen of his older works for the alto flute into nine new works. Four duetts for two *c* flutes, and three trios for two *c* flutes and the alto flute corresponded.

In his eighty-sixth year, in 1880, he made us a present of an Andante from Beethoven's Serenade, op. 25. The simple theme of sixteen bars appears in two variations; the first reminds one of brilliant triplets, the second gives us a charming *cantabile*, followed by a fiery *coda allegretto* in six bars. It furnishes the virtuoso with sufficient material to display his whole power, and his acquaintance with the art of phrasing.

Furthermore there is the wonderful Andante for flute in *c* major, by Mozart, accompanied by two violins, viola, counterbass, two oboes, and two horns. Böhm arranged the accompaniment for piano, adapting the form to the modern taste. Jahn does not think much of that composition, but he who has heard it played on a Böhm flute, and by Böhm himself, will be of quite a different opinion. The Andante is marked Mozart op. 86; but this number is to be found neither in Mozart's own list of his works nor in Köchel's. Musicians and music publishers do not, of course, care very much for such pedantic chronological

dates, thus rendering the task of the historian of music a real torment. In Köchel's list we find the number 15. The autograph has no date ; it dates, however, probably from the year 1778, and was, according to Köchel, composed either at Munich or in Paris.

A second arrangement of a work for clarinet, for the flute, was published by Schott, under the title, 'Adagio from the quartett⁴⁷ for clarinet by W. A. Mozart.' This quartett, in Köchel's list, bears the number 581. The Adagio, originally called "Larghetto," was transposed by Böhm from *d* to *g*, thus gaining exceedingly in loveliness.

His swan song bears the characteristic name 'Elegie' ; it is written in *A \flat* major, and represents sweet melancholy, rising in the fortieth bar to touching complaint, but subsiding by degrees into peaceful resignation. It is the old man who, already ailing, said in his eighty-ninth year, "I should like to reach the ninetieth year ; but God's will be done !"

The 'Elegie' is composed for full orchestra, the latter rendering the whole composition most magnificent, and giving character to what is only indicated in the flute part. It was published, as Böhm's 47th and last work, by Schott of Mayence, last year.

Böhm dedicated it to his old friend Dr. Friedrich Isenschmied, formerly physician to the King of Naples, who had exchanged the old flute for Böhm's instrument, and attained to great proficiency on it. It was very pleasant for Böhm, who led a lonesome life,⁴⁸ to spend

⁴⁷ The Doctor has written quartett instead of quintett. It is the celebrated quintett in A, op. 108, of which he is speaking.—C. W.

⁴⁸ No doubt Boehm, after the loss of his wife and the death of most of his friends and contemporaries, sometimes felt lonely and weary, prohibited, as he was, from reading, writing, and flute-playing. His declining days, however, were solaced by the tender care of his daughter, who remained unmarried, devoting herself to her father, whilst almost every evening was cheered by the society of his friend Dr. Schafhäutl. Moreover, scarcely a day passed without

some time in the home of this Swiss gentleman; it brought to his remembrance his journeys in Switzerland when a young artist.

Always active, and ready to be of use, old Böhm one day stepped on a chair in order to regulate a pendulum clock. The chair broke, and Böhm fell on the floor; he immediately rose, and seemed to be unhurt. But from that time he complained of dizziness, which gave him much anxiety when in the street. This was attributed to nervous irritability of the stomach. But suddenly he was taken with chills, and his powers sank so rapidly, that he prepared for the last journey. In addition to this he suffered very much from sick headaches, which finally deprived him of consciousness. He was given up by everybody, but recovered nevertheless, much to the astonishment of his physicians. He then continued his usual walks for hours every day, went to his café in the afternoon, or to the Museum, where his friends acquainted him with all that was going on, reading being forbidden on account of his weakened eyes. Böhm, being an excellent chess-player, was always requested to play a game, and, despite his old age, he willingly did so, only asking for a little patience on account of his feeble sight; he generally beat his antagonist all the same.

BÖHM'S DEATH, FAMILY, AND PHYSICAL CONSTITUTION.

His hearing, formerly so acute, became weaker and weaker, and so also did his eyesight, which had been much debilitated through his working in the glare of

a visit from some of the members of his numerous family, and on Sundays they assembled round him at a "family coffee." How much pleasure he derived from these gatherings and how fully he appreciated such tokens of affection I learnt from his own lips.—
C. W.

puddling-furnaces, so that finally reading, writing, or drawing was quite out of the question. Moreover, the lips lost their elasticity ; he could no longer produce the lower notes, and had to take leave of his oldest friend, the flute. He nevertheless continued teaching his last pupil to the very end. This pupil did not want technique ; he was, however, lacking in a fine style, and Böhm endeavoured to teach him that art. Where his flute would not do, he helped himself with singing. Once a rude young fellow angered him exceedingly, and his broken strength could no longer offer any resistance. "I should like to live a few years longer, but the Lord's will be done!" He died on Friday evening, November 25th, 1881.

Böhm left eight children, of whom seven were sons ; all but one are in prominent positions, most of them inherited their father's keen mind and mechanical talent, but not one of them his musical genius. There are moreover thirty-six grandchildren, and two great-grandchildren.⁴⁹

⁴⁹ On October 20th, 1820, Boehm married Anna Rohrleitner, of Munich. She was a simple woman, but she proved a faithful, loving, and exemplary spouse, and an excellent housewife. During her husband's long periods of absence she managed, with very restricted financial means, to keep her household, consisting of eight children, apprentices, workpeople, &c., in order, and a most perfect order it was. It was to her that her children owed their careful education, and their father, who lived and died in the house in which he was born, the advantage he enjoyed of always finding on his return from abroad a comfortably arranged and orderly home, and all the tranquillity he required for his studies and inventions. On October 30th, 1870, they celebrated their golden wedding, surrounded by seven sons, one daughter, seven daughters-in-law, and thirty grandchildren. They were not parted for more than four years afterwards.

The eldest of Boehm's eight children is his daughter Mary. Of his seven sons, the first, Ludwig, held the important appointment of manager of the Maffei Locomotive Factory at Munich. He retired in 1886, when he had been connected with the firm for forty years. The second, Carl, was secretary and cashier to the

We have thus before us a beautiful image of human life passed harmoniously in activity and love of art. Art took Böhm from one of the noblest handicrafts, and carried him with brilliant success through the world. The atmosphere of the so-called virtuoso-life produced but a superficial effect on young Böhm's fine character. He always returned to his family from the brilliant world, and Art ennobled his rich domestic life. He was an elegant man of the world, but also sincere, kind, self-sacrificing, and to all warning against trusting others, he always replied, "I prefer being cheated to despairing of mankind."

His funeral was most remarkable. All classes of society followed him to the grave; mingled with professional musicians there were amateurs, government officials, artisans, and even billiard-players, Böhm being a well-known billiard and chess-player. He played his game of chess every day, although, in consequence of his weak sight, he could scarcely see the chessmen.

Böhm was slim, and in his youth rather threatened with consumption. When at the commencement of his studies he used to play at the receptions given by the "Frohsinn" society, every one exclaimed, "What a pity that young man with short breath plays the flute!" It was, however, precisely the flute that saved him. Flute-playing expanded his chest and destroyed his tendency to phthisis. He became a most rapid walker,⁵⁰ and

late Prince Charles of Bavaria. Theobald, the third, who died in 1889, carried on the family business of goldsmith and jeweller. Wilhelm, the fourth, was manager of the gasworks at Stuttgart; he died in 1893. Max, the fifth, is a clerk in a municipal office at Munich. August, the sixth, is cashier in the Munich post office; whilst the seventh, Otto, who died in 1893, was manager of the Bavarian State Railways.

⁵⁰ During a visit to England, Boehm once took lodgings in the suburbs of London. One evening, as he was striding homewards with his usual quick step, he became aware that he was being

could not be tired out by excursions lasting a whole day ; he was also ideal at running and leaping. This is a palpable proof of the correctness of the advice given by our great surgeon Nussbaum, who advises, in his classical essay "Hoch und Wohlgeboren," that people afflicted with a tendency to phthisis should work it off by constant exercise, thus expanding the chest by playing on the flute, for instance. Böhm is evidence that this pernicious tendency can be cured without having recourse to drugs.

BÖHM'S MEMORY IN ENGLAND AND AMERICA.
SYMPATHY LACKING IN GERMANY.

The death of this remarkable man has, *of course*, not made any stir whatever in Germany. In North America the report of Böhm's death was indeed sad tidings. Most of the American newspapers written in English published very sympathetic obituaries, and the 'New York Herald,' the most important paper of America, if not of the whole world, gave one of the lengthiest

followed by a man. He quickened his pace, so did his unwelcome companion. After a time, in order to get rid of him, Boehm turned into a road running at right angles to the direction in which he was going, but only to find that his footsteps were still dogged. It was already dusk, night was falling, whilst the way was becoming more and more lonely. It seemed to Boehm that his best plan would be to bring matters to an immediate issue, so turning suddenly round, he accosted the mysterious stranger. This led to an explanation. It turned out that Boehm's pursuer was a gentleman who took an interest in walking. Struck with the rapidity with which Boehm was getting over the ground, he was following him in order to ascertain how long he would keep it up.

Boehm never gave up his habit of walking. His last walk was one of two hours' duration. On his return home, it being observed that he was not well, he was induced to retire to bed. He had not long been recumbent when he became unconscious. However, consciousness afterwards returned, and his life was prolonged for a day or two.

biographies of Böhm. Even at Louisville, in Kentucky, there was, in the supplement to the German paper 'Omnibus, der Unterhaltung, Belehrung, und dem Humor gewidmet,' a 'Nachruf aus America,' a poem to the "celebrated flute-player," written by a lady, Betty Wittgenstein, dated December 25th, 1881. The lady had probably often written poems in honour of Böhm, for the poem commences:—

"Once I sang thee on thy cradle-feast
A poem of mine. . . ."

In a letter from Eugen Weiner, the most celebrated flute-player of North America, member of the New York Musical Club, to Böhm's daughter, it is stated, "In the last few days over a hundred persons, and amongst them the most renowned musicians and flute-players of New York, have called on me, in order to make inquiries about the death of Herr Böhm." Together with the name of Prentiss, the banker, he writes of dozens of names of musicians and professors who desired him to convey their profound condolence with the family of Böhm." He also says that there is scarcely anything about Böhm in the press of Germany, and concludes, "How very annoying for us Germans in a foreign country!"

However, Böhm was always recognised and admired by artists and amateurs, who had become quite familiar with his flute.

One of the reasons why Böhm was less known in Germany may be the fact that he made his tours as a travelling artist only in his youth, that was at the time that long preceded the period of the present writers and authors on music. In later years Böhm appeared publicly in England only, and even in that country rather from motives of friendship in closed circles of the aristocracy, who admit only the most distinguished artists, or at charity concerts.

The Böhm flute has made its way all over the world. Since the year 1847 Böhm's flute-factory at Munich has furnished flutes for Germany, Austria, Holland, England, Sweden, Norway, Moldavia, Wallachia, Rumania, Switzerland, Italy, Greece, Russia, East Siberia, Blagowestschensk (on the Amur), Smyrna, Georgia, Madras, Ceylon, China, Japan, Luxemburg, Belgium, France, Spain, North America, Canada, Mexico, Peru, Paraguay, &c. To obtain this result there was required the labour, the study, the perseverance, and the genius of one man during half a century.

If there is for man a higher destiny than (as Lessing holds) to spend his existence in blowing into the mouth-piece of a flute, our Böhm, although he vivified the dead flute all his days with his breath, has done more than even Lessing has set down as the goal of a man's life. He was a thinker, a clever, ingenious, indefatigable worker, a good man and a good citizen, moreover a virtuoso and a creative artist, who has delighted and will delight thousands with his compositions. At the conclusion of his long life he could with complacency look back on the troubles and the fruits of an activity of sixty years; and I can now lay down my pen with a certain satisfaction, having given a faithful image of the life and mind of a very remarkable man, whose name will always be appreciated in the world of music.

BOEHM'S COMPOSITIONS.

I.—PRINTED COMPOSITIONS.

Date.	Opus.		Publisher.
1822	1	Concerto for Flute with Orchestra and Piano., G maj.	Aibl.
	2	La Sentinelle (Thème fav.) varié.	"
	3	Andante and Polonaise, A maj.	Diabelli & Co.
	4	Nel Cor Più. G maj.	Aibl.
	5	Pot pourri (Melodies Suisses), G maj.	Aibl & Peters.
	6	Divertissement (Air de Carafa) also with Orch. G maj.	Falter & Son.
	7	Concertante for Two Flutes (Orch.), D maj.	Aibl.
	8	Polonaise de Carafa, D maj.	Falter & Son.
	9	Variations (Thème de Freyschütz), D maj.	Aibl.
	10	Divertissement (Thème de Rovelli), C maj.	"
	11	Divertissement (Deux Thèmes fav. Suisses), C maj.	"
	12	Rondo brillant with Orch., C maj.	Falter & Son.
	13	Divertissement (Almenlied), C maj.	"
	14	Boehm and Ogden,* Fantaisie conc., D maj.	"
	15	Cannot be found.	
	16	Grand Polonaise, D maj. ..	"
	17	Variations on the March in Rossini's Moïse, D maj.	"
	17a	32 Études dans toutes les gammes.	"
18	Waltz and Pot pourri. The Waltz on a Melody by Schubert, D maj.	Aibl.	
1838	19		
	20	Variations (Swiss Boy), C maj.	Schott.

* Ogden was an English gentleman, the first who made himself familiar with the Boehm flute, and appeared as its patron.

Date.	Opus.		Publisher.
1838	21	Fantaisie (Sehnsuchts-walzer) A♭ min.	Schott.
1840	22	Vars. brill. Du, Du, E maj. ..	"
1845	23	Fantaisie sur des Thèmes Suisses, F min.	"
1845	24	Fantaisie sur des Airs Écos., F maj.	"
April 1852	25	Fantaisie sur des Airs Écos., C maj.	"
July 1852	26	24 Caprices-Études	"
Oct. 1852	26a	Andante by Mozart, C maj.	"
1853		Souvenirs des Alpes :	"
	27	No. 1. Andante Cantabile, E♭ maj.	"
	28	No. 2. Rondo Allegretto, F maj.	"
	29	No. 3. Andantino Romance, D maj.	"
	30	No. 4. Rondo Allegretto, D maj.	"
	31	No. 5. Andante Pastorale, G maj.	"
	32	No. 6. Rondo Landler, E maj.	"
1858	33	Andante Cantabile, B maj. ..	"
June 1858	34	A la Tarantella, E min. ..	"
Jan. 1859	35	Larghetto, A♭ maj.	"
March 1859	36	Rondo à la Mazurka, C maj.	"
1863	37	24 Études, 2 Suites avec Piano ou Flute Solo, B♭ min.	"
1860-61	38		
	39		
	40		
	41		
	42		
	43		
	44		
	45	Fantaisie on a Motive by Hummel, Flute with Piano.	Aibl.
	46	Andante from Beethoven's Serenade, arranged for Flute, with Pianoforte Ac- compagnement, G maj.	
	47	Élégie pour la Flûte avec Accompagnement de Piano ou d'Orchestre.	Schott.
		Andante con Variazioni, G maj.	Aibl.
		Hymne.	"

II.—COMPOSITIONS OF CELEBRATED MASTERS,

Arranged for the Flute and Pianoforte, or, here and there, Harmonium. These Works being Arrangements only, Boehm did not give them an Opus number.

Date.	No.		Publisher.
1868		Cujus Animam, Rossini, Flute and Piano.	Schuberth of Leipsic.
	1	Adagio, Beethoven, C maj. ..	Aibl.
	2	Adagio, Mozart. From the Pianoforte Sonata, Op. 16, B maj.	"
	3	Rondo - Andante, Mozart, A min.	"
	4	Ständchen, Song, Schubert, D min.	"
	5	The Fishermaden, Schubert, D maj.	"
	6	Tre giorni. Air by Pergolesi, C min.	"
	7	Cantabile, by Vogler, for Pianoforte or Harmonium and Flute, D maj.	"
1872-76	8	Aria Cantabile, by J. S. Bach, for Pianoforte or Harmonium and Flute, D maj.	"
	9	Serenade, Beethoven, Op. 8, for Flute and Pianoforte, F maj.	"
	10	Romance, Beethoven, Op. 50, F maj.	"
	11	Variations, Haydn, "God Preserve the Emperor," for Pianoforte or Harmonium and Flute.	"
	12	Fantasia on a Motive in a Sonata by F. H. Himmel	"
1874-79		Air from Gluck's Orpheus, "Che faro," for Pianoforte and Flute.	Schuberth of Leipsic.

III.—UNPRINTED COMPOSITIONS by BOEHM,

For the Alto Flute, or as Duets and Trios for Two Flutes in C and Alto Flute.

—

For Alto Flute and Pianoforte.

1. Beethoven, Sonata, Op. 17. The original for Horn and Pianoforte. F maj.
2. Beethoven, Serenade, Op. 24. The original for Flute (?), Viola, and Cello.
3. Beethoven, Adagio from a Pianoforte Concerto. A \flat maj.
4. Mozart, Sonata. Originally for Pianoforte and Violin. G maj.
5. Mozart, Adagio. From the Clarinet Quintett. D maj.
6. Mozart, Adagio. From a Pianoforte Sonata. B maj.
7. Mozart, Rondo Andante, Op. 71. Originally for Pianoforte alone.
8. Haydn, Variations on "God Preserve the Emperor." Originally for String Quintett.
9. Schubert, Song (Das Ständchen), D min.
10. Schubert, Song (Das Fischermädchen). A maj.
11. Schubert, Song (Am Meer). C maj.
12. Himmel, Rondo. From a Sonata originally for Flute and Pianoforte. G maj.
13. Vogler, Adagio. From an Organ Prelude. D min.

*Duets for C Flute and Alto Flute with Pianoforte
Accompaniment.*

14. Rossini, Duo (Soirées Musicales). A maj.
15. Rossini, Duo (Soirées Musicales). D maj.
16. Weber, Romance. F maj.
17. Weber, Andantino. C maj.
18. Weber, Allegretto. C maj.

Trios for two C Flutes and Alto Flute.

19. Cantabile, Vogler (Organ Prelude). D maj.
20. Beethoven Trio. Originally for two Oboes and Cor Anglais. F maj.

For Soprano Voice and Alto Flute.

21. Graduale, by Schiedermaier, with Latin words for Church use and German words with Pianoforte Accompaniment. C maj.
22. Graduale, by Walter, for Alto Flute (Solo) with Vocal Quartett and two Violins, Tenor, Cello, and Double-bass. E maj.

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