

# Achieving Balance: Clean, Oil, and Adjust

by Sarah Mellow

For both the technician and owner, a flute's annual C/O/A involves more than a defined set of mechanical adjustments. It's an opportunity for communication, art, and balance.

**D**on't say you weren't warned. The flutemaker must have told you, or the dealer who sold your flute, or your teacher. Somebody told you that you should have your flute cleaned, oiled, and adjusted once a year. But you can't bear to part with it; you're practicing, preparing for an audition, you have commitments, and it's playing just fine. You'll take it to a repair person soon, promise.

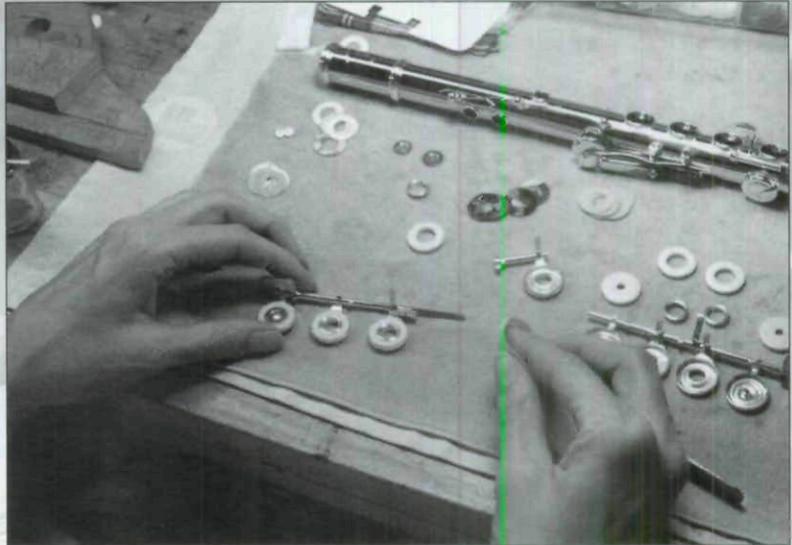
A few years pass, and your constant companion is not speaking clearly. It seems out of tune with the world, protesting with unbecoming clacks. You alter your technique. Making music gets harder. But the change was so gradual, you think it's you, not the flute: *I really stink. I'll never be any good—maybe I should just quit!*

Take a close look. Tarnished spit spots and swirly finger smudges camouflage the silver tube. Tufts of your cat's fluffy undercoat have collected around the mechanism tubing, anchored in crannies by some mysterious, black residue. There's crud inside the embouchure hole, and the head joint's crown turns too easily; the head cork is loose. Your neglected flute needs an appointment for a "clean, oil, and adjust" or C/O/A. This is the term commonly used by flutemakers and repair technicians to mean regular maintenance. It is not an "overhaul"; both services leave your flute shiny and clear-voiced, but they're not the same. In the simpler clean, oil, and adjust, parts are not normally replaced, and the mechanism is not normally repaired, just adjusted. Ideally, a C/O/A should be done annually.

More particularly, in a C/O/A, you clean the body tubing, keys, and mechanism, replace old oil with new, level pads that are leaking, perhaps replace pads that are frayed or broken, correct key adjustments, check and/or replace the head cork, adjust spring tension, and play.

## What Happens in the Shop

Techniques vary, of course. In a typical approach, a good repair technician will first go over your flute, take notes on the condition and fit of pads and mechanism, and give you a cost



The jewels in your flute: paper shims, pad washers, and paper washers, among other parts.

estimate. After that, and before you get your instrument back, playing like new, here's what likely happens. She disassembles the flute, and dips the body tubing into an ultrasonic cleaning tank, which removes oils and grit from inside the posts and other hard-to-reach places. She dries the head, body, and foot tubes, and hand-polishes them with a thin layer of silver polish, then blows or wipes the posts clean in preparation for lubrication. (Not that cleanliness, when it comes to flutes, is always next to godliness. One customer of mine swore that wiping a fingertip on the side of his nose before playing gave him just the right tackiness between finger and key, and was the secret to his flawless technique.)

Some customers ask to have their flutes buffed to remove scratches, but this practice is normally reserved for overhauls, not annual cleaning; machine buffing actually removes metal, and, done too frequently, can reduce tube thickness, changing the response of the flute.

Next, if your flute is built this way, the technician will unpin the mechanism with a few, delicate (we hope) taps of the hammer, and slip each key off its steel rod, like unstringing pearls from a necklace; gently polish the keys; swab out the key tubing and clean the steel rods with alcohol. The final step before repinning and reassembling is to oil each key.

Oil is important. Different keys need oil in differing amounts, and with different frequency. Lack of oil can cause premature wear on the mechanism tubing; when it dries up, metal rubs against metal, wearing down the surfaces holding keywork in position, and creating "lateral play," that side-to-side movement you might feel if you grab a

key and try to move it back and forth. Without oil, dirt enters the crevices between keys, causing the mechanism to feel sluggish, accelerating the breakdown of metal-on-metal surfaces. When play develops in the mechanism, the seal of the pads is compromised. A sideways shift of only a few thousandths of an inch, where the pad impression meets the tonehole, can create a leak.

Levelling pads and correcting the adjustments take time and finesse. The instrument calls the shots here; every flute has its own mechanical tendencies. Your repair person will hunt down leaks with a feeler gauge, usually made with a narrow strip of cigarette paper. She places it in the gap between pad and tone hole, and withdraws it slowly with the cup closed. Testing each point around the pad for even pressure, she then removes pads from their cups to shim them, often several times for any given pad, filling leaks with slivers and rounds of paper measuring one, two, or three thousandths of an inch thick, thus eliminating even the slightest leaks. After this, she regulates the precise opening and closing of the keys, adding or subtracting pieces of felt, cork, and paper to the adjustment surfaces of the mechanism.

### The Art of Balance

Flute repair comes down to the art of balancing. Successful technicians have a streak of perfectionism, which they balance against the the age and condition of each instrument, as well as its ability to remain in stable adjustment. They balance the time spent with a flute, making it play as well as it can while considering the needs and sometimes financial constraints of the flute's owner. Every flute presents the technician with a window of balance—in the proper relationships between spring tension, tightness of mechanism, and the feel of stable pads. Craft work in general, and flute work in particular, relies

on empirical knowledge: One learns by doing. Learning to adjust and balance any one type of flute takes years of practice, and keeping track of the peculiarities of multiple flute brands and padding systems only adds to the difficulty. A repair person who gets to know your flute, who remembers your preferences and playing style, is a rare and valuable colleague.

The price of a clean, oil, and adjust appointment can range from \$150 to \$400, or even more. This spread reflects more than the differences among repair shops in their hourly rates; it means that time must be spent taking apart the flute and getting to know its quirks before an intelligent cost estimate can be made. Even with this good-faith effort, it's often hard to correctly estimate the amount of work a flute will require. If the cost estimate turns out to be significantly off, the repair person should be able to explain why. The flutist, meanwhile, should try to listen and remain open.

Dozens of things affect pads and keywork, but generally speaking, for a flute serviced every year or two, the cost of a C/O/A will be less than if the instrument hasn't been professionally maintained. The cost will be more if one or several pads need replacing. In that case, you'll have to wait longer and pay more; it takes time to find and order pads that fit your flute precisely, to install them, play the flute, and allow old and new pads to settle into a state of equilibrium. Less predictable elements include the frequency of playing and your technique; if you squeeze or exert sideways pressure on the keys of the right hand, for example, it can affect the wear on pads and mechanism. Other factors, such as climate, air pollution, and how you clean and store your flute, also influence its condition.

Flute technicians don't have an organization that educates and upholds industry standards, like the Piano Technicians Guild, but maybe we should. The flute world is growing and

changing quickly. Instrument and pad choices are broad and varied, and flutists need access to competent, qualified help.

If you're contacting a repair shop for the first time and are uncertain about the credentials of the flute technician, ask for recommendations from a few customers. You're trusting this person with a precious, perhaps irreplaceable, partner. Don't feel shy about asking questions. Expect cogent answers. Real music can happen when the lines of communication between player and technician remain satisfyingly open. A carefully maintained flute will play for years longer than a poorly maintained one. And if you're happy with your flute, you want it to last forever.

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