A Little about Planes and Planing



Compass plane by Christian Schiedt, Master cooper in Lauffen am Neckar

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A LITTLE ABOUT PLANES AND PLANING

There are a lot of misunderstandings about planes, especially about wooden planes, which do not further understanding. Modern "improved" designs such as the Ulmia and its clones further cloud the view. Planes are deceivingly simple, really. The standard plane for the last two or three hundred years is and has been the jackplane with its included angle of 42°. In all cultural circles, angles vary within a very limited range between 40° and 50°. Anything steeper must be considerd a scraper and of course there are scraper "planes" as well. Given a definition that a plane is a cutter held in a (wooden)block, virtually anything can be termed a plane. But since the term plane itself comes from the root plane:

ORIGIN Middle English : from a variant of obsolete French *plaine 'planing tool,'* from late Latin *plana* (in the same sense), from Latin *planare 'make level,'* from *planus 'plain, level.'*

it seems safe to include only real cutting tools under the heading "plane."

The jackplane is not necessarily a longer smoother, it is not a smoother at all in fact, but it often is a bit longer. The misuse of the term jackplane is modern. A jackplane (German Schlichthobel = schlicht = simple or plain) is a plane with a simple (schlicht) i.e. not compound blade, a blade without a capiron. It is always between 40° and 42° and is meant for quick a dirty if relatively effortless straightening. or smoothing the rough after sawing or usi of a scrub plane. With very clear wood planed with the grain, the surface obtained by such a 40° jackplane cannot be bettered but the wrong direction can give terrifying tear outs. But since the jackplane is mean to be fast and easy (not simple) that is to be expected. A Stanley "Handyman" is a jackplane, but a Stanley N°.5, commonly termed the jackplane, is not because it has a 45° angle and a cap iron.

Traditionally, such simple planes (as opposed to compound planes (Schichthobel > Doppelhobel = lit. double plane or one with two blades, i.e. with capiron) have very narrow boxes and not very wide mouths.

This is a very old and misued **jackplane** converted to a very wide convex moulder:



What is important here are the visible construction lines where the front line and the top surface of the blade and the wedge line converge at a point originally present, giving the original height of this plane with 63 mm or 2"3" of our local 28mm inch. That is not important, though. The angle is the expected 42° and there was no allowance for a mouth as such initially. Now the actual box of this plane looks like this:



And from the bottom:



So the actual box has two angles, neither of which coincide with the construction line. for a good portion of the actual mouth, the angle is reversed in fact. This has two advantages:

- 1) trueing the sole does not widen the mouth nearly as fast;
- 2) the mouth can be kept closer, curbing tearout to a certian extent.

This box design was normal for all wooden planes until the advent of the Ulmia gizmos. The angles varied of course with purpose. For jackplanes, the reverse angle could be kept very close. here are several more, German and French in origin:















The first two are replicas I made in 1975 and 1977 resp. of very depleted originals by Christian Schiedt. The third are mouth and box of the frontispiece plane by Schiedt and the bottom is a late 19th.c. French plane, possibly by Goldenberg but not stamped; it is not "homemade." The blade is the better quality Goldenberg with two eyes. This akin to Stanley's "Sweetheart" trademark with one or two hearts.





Here, then, is the 1975 jackplane (first of the four and with that single "eye") and the ca. 1900 French smoother (Doppelhobel), the fourth of those above with the two "eyes." Both are 42° , both have the then standard 42mm wide blade = 1.5" 42/7=6 or 6/4ths = 18 lines. that local inch was ± 28 mm. En passant, you see, too, that the smoother has no nose or grip of any sort while the rough and tumble jackplane has a traditional nose, not to hold but to hook the thumb around so as not to have to grasp so firmly. The modern nose is an abberation grown out of "improvements" thought up by people no longer willing or able the use the tool as it was meant. A normal plane does not need a nose; such a plane has no front or back. It must work in both hands in both directions. Like those above. The compound plane, today called the smoother, has a second blade, the capiron which can just be discerned.



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It is held in place by the wedge and is almost flat save for a slight "shovel at the end, a bit like a ski. It is adjusted with the bench hammer which owes it form to just this purpose and nothing else.



The bottom one is just such an early 19th.c. bench hammer. Like the Japanese above it, the head has hardened peens but is not itself hardened. remarkably like the Japanese, too, it has a 1' long handle and a remarkably similar weight or ± 400 gr.

The reverse angle of the box to form the mouth must be less for compound planes because the capiron needs some room of its own. For this reason as well, trueing smoothers enlarges the mouth much more quickly than with jackplanes. The capiron itself (contrefer=couter blade; German Klappe or cover which is meaningless) must fit. It must not rock when laid loosely on the blade and must close tightly against the surface under light pressure.



This is the capiron of an ECE coffin shaped smoother. The front edge of the capiron must not be sharp but have a blunt, almost vertical land.



The sole purpose of the capiron is to break the fibers of the shaving to prevent splitting of the wood and thus tearing out. So, it must be clear that the shaving must be broken and not more or less gently lifted.

The wedge should extend as far as possible towards the end of the blade. For jackplanes with their flat blades, this means very far forward.



It can be seen that what some possibly thought was just decoration serves a very real purpose! Of course in planes with capiron, the wedge should not extend beyound the point where the capiron curves down or shavings will lodge under the ends of the wedge and clog the mouth. These details must be gotten just right as compound planes are easily wont to clogging.

As for the wedge itself, the classic angle is about 1:10. Of course one must make due with whatever the plane at hand has but when making a plane yourself, use 1:10.

The combination blade+wedge must fit just so, the wedge seating along its entire length for jackplanes and up front first with capiron which will compress a bit. The surface under the blade itself in the plane body should be slightly hollow so that the blade lies securely at the bevel end and cannot chatter. For this reason, too, the wedge should go as far forward as possible. The fit of the blade+wedge combination then must be so, that **very little** force is necessary to keep the blade in place: the friction of the combined surface should play the all-important role. The weight and handle length of the bench hammer are so that **no** exertion with it is necessary; its mass is what does the job and that strikes always with the same force. What little pressure there is should be at the very front. With traditional wedge grooves, the pressure and friction are contained at the sides of the plane and, properly setup, the blade can move under the wedge without it or the capiron. Setting the chip then with a loose capiron means initially setting the chip itself and then moving the capiron forward until the desired breakage is given. Seems like more work but is actually more flexible and quicker in actual usage. Because the pressure is contained in the grooves at the sides, the sole is much less deformed. That is the main drawback of the Ulmia gizmos. The blade is not held by friction and fitting at all, just by the pressure exerted by the wedge and this is directed to the sole behind the blade, thus forcing the sole out, distorting it and making the plane unusable. Because this force is rather high, this deformation is a continuing process, meaning continuous trueing and continuing until the sole cracks either side of the mouth. Because the force is quite high, the forces necessary to set or remove the blade are much higher as well. Old planes never have an iron striking cap and never need one. Regardless, one should never loosen the blade of any plane with a hammer. Grasping both wedge and blade firmly, strike the entire plane against the endgrain of the workbench.



The modern design is poor. It is the product of people streamlining the manufacturing process, not the tool, and the arguments given as its advantages are rationalizations after the fact.

The traditional grooved wedge design is good, not because it is old or craftsman-like but because it is technically sound.

Today there is really only one manfacturer left making a decent wooden smoother and than is ECE. Their coffin-shaped smoother in the picture above is is the best traditional plane you can buy new. But it comes with too large a mouth. Who knows why; they don't; I asked...

So as with antiques or continuously used newer planes, the mouth must be patched.



The patch can be from the next-best dense hardwood but box is best as in the plane at the left. The new patch shown is european red beech which is much harder than N.American beech. The front edge of the mouth must be a hard as possible, commensurate with the application. A wide smoother for cabinet surfaces like the ECE which itself is beech should be box or hornbeam or holly. Pear is good enough for a jack plane. Do not resort to exotic woods which are only just gluable at best.

Make the patch just slightly wider than the mouth and clamp it to the plane so that the new mouth edge slightly overlaps the actual cutting edge. As with any plug, the virtical edges should be slightly off square, making a slight taper to the whole piece. Mark around the patch with the marking knife. Remove the blade and cut in the plug like any other chiseled-in patch. Glue it in and allow sufficient time for the thing to completely dry. Plane it just flush. The mouth will be too small now. The most common error at this job is allowing for a mouth while marking out and this always results is too large a mouth again. Now replace the blade, letting it butt against the plug, it should not be able to protrude yet - and replace the wedge with more force than necessary. Plane the sole - NEVER SAND! - true with the blade under under tension. It always must be done this way, with the blade in place because of the deformation always present due to the force of the wedge, even in the traditional design. Depending on purpose, the sole can be left completely flat but this is only for finest shavings and furniture surfaces, or very slightly rounded across the width.

With a smaller blockplane, remove one or two shavings from just behind the mouth but only there. the most important point of the sole is the front edge of the mouth. If this does not contact the surface being planed firmly, the plane with not work properly. The finer the shaving and demanding the work, the more important this is. The sole behind the blade can be hollow. Do not chamfer the front or back edges but the side edges can be generously beveled right up to the mouth if necessary. If you chamfer front or back edge, shavings and dust can too easily roll under the plane during the stroke. This is of course for a coffin plane not necessary or possible; the shape alliviates the need. Now you can remove the blade and dress the edge of the plug so as to give the desired width of mouth. For a very narrow mouth, do not make a reversed angle at all. On the contrary.



Do not make the mouth too narrow or the plane will continually clog. Either the capiron is the governing breaker edge or the mouth is. Both simutaneaously do not work. With a very narrow mouth the capiron must be set generously back. This works but wears out the edge of the mouth very fast if of wood. This wear is the reason for the invention of the iron plane. they have no other advantages.

The ECE has an angle of 45°. It is patterned after the typical scottish smoother. The angle is really only good or necessary for hardwoods. For hard to plane softwoods like fir the flatter 42° or even 40° are much better. That said, I use the ECE shown here quite often to finish off soundboards which I virtually alays make of fir. For roughing out and thicknessing, I use my dimestore Goldenberg, bought in a Strassbourg supermarket for all of 25DM (pictured below showing the angle less than 45°). It is of the traditional design, made of live oak, a southern french/spanish trait and has that loose capiron and traditional, usual 42mm blade. The ECE below it has exactly

45°.

The 19th.c. scottish infill coffin smoother I have has only 42° and a not all that narrow a mouth but it does best of all. Only bettered by my trusty 91/2 block plane with infinitismal mouth.



As for cast iron block planes, the standard 9 1/5 and its cousins, N°s 15, 16, nd 18 are not low angle planes. The base angle of the body is 12°. Together with the normal grinding angle of 30° this gives an included angle of 42° jut like any other plane of this type, iron or wood. The two low angle models have a base angle of 6° I think it is, giving an included angle of 36°. These are, like the coveted N°.62 endgrain planes.

The "pianomaker's plane" or mitre plane is also not a low angle plane at all despite its apperance. It has exactly the same geometry as the lowly 91/5.

a mitre plane by John Cox, Lincoln's Inn Fields, 1850:



an anon 19th.c. chariot plane



An anon 19th.c.scottisch infill smoother, my favorite:



Several longer planes from the jack plane on top to a long joint at the bottom:



Lauffen am Neckar, 2010