Like Seashells
The work of John Macnab

BY EMANUEL JANNASCH

In taking this marvel as my theme, I did the same as a passerby who has just picked up a small, curiously formed, calcareous shell in the sand, who examines it and handles it, admiring its mineral convolutions and the arrangement of spots, streaks, spines suggesting the past movement in which they were engendered…I knew next to nothing about mollusks and I took pleasure in illumining, one by one, the facets of my ignorance.

Ignorance is a treasure of infinite price that most men squander, when they should treasure its least fragments…

—Paul Valery, introducing his essay "Man and the Seashell"

John Macnab's new works first bring to mind exotic seashells, forms of evolution and growth; or the horns of some fabulous mountain antelope, maybe, or the spiral and counter-spiral of a pine cone. They could be illustrations from D'Arcy Wentworth Thompson's classic study of natural geometry, *On Growth and Form*, or from Theodore Andrea Cook's *The Curves of Life.*

Like their natural cousins, Macnab's pieces stand on a similar threshold between inert mathematical structure and dynamic, living organism. From a distance, some of Macnab's compound spirals look grown; others, grown but at the same time wizened, like an ancient gnarled tree. Then again, some appear to be fibrous—bundled and twisted and tensed like a muscle; others still, as though they were swirled into a vortex as a fluid and then frozen solid. Up close, though, we see by the fine tool marks and the perfect glue lines that each piece was in fact subtracted from a built-up blank. One can only wonder what method or tool achieved such forms: fantastically convoluted yet at the same time completely ordered. Viewers accustomed to asking themselves what does a piece evoke or what does it say are facing a different question: how did it come to be? Although totally compelling as pure forms, their meaning or significance derives not only from the outward form itself, but from the processes of which the form is a remnant or register. It hardly seems possible that the pieces are lathe work, but this is what they turn out to be.

Now, the lathe on which they originate is not a standard-issue machine. It is a remarkable instrument that John has built himself, or rather, that he is reinventing and rebuilding as his work develops. Our story is about the co-evolution of medium, mechanism, and mind. The idea of geometry, as a link between consciousness and cosmos, is a leading character in this story. The machine appears as an extension not only of the designer's intentions but also of natural processes. We get a sense of the mysterious suspension of our human being between the realms of artifact and nature, and a glimpse of one very independent human spirit exploring that mystery. And at the same time, like any truly radical work, it is rooted in the origin and the history of its discipline.

BACKGROUND AND EARLY WORK

Macnab began woodworking in a historical vein, building pieces for the most part modeled on 18th-century designs. This work expanded into the repair of antique pieces, a field in which he is highly regarded. One is struck by Macnab's devotion to a material culture and the motivations it embodies, as well as the respect he holds for his forebears and for those who have repaired, refinished, and otherwise shepherded pieces through the vagaries of time.

Close attention to history reveals a continuum of innovation rather than a series of static "periods." Having immersed himself in a tradition, John is not limited by its past forms, but participates in its ongoing life. Feeling at home in the evolution of how things have been made, he appreciates the expediency as well as the attention which early artisans brought to bear on their work. As a result, he rules out no technique or material or device which might further his work. Dropping in on his shop you'll see there's a bandsaw and a chopsaw, but no tablesaw. You'll see a joiner's bench alongside a TIG welder and a machinist's lathe. You'll note polyurethanes and hide glue, but no white glue to speak of; carbon fiber but no joint-biscuits. John uses several fine old planes and a jointer, but has no shaper or thicknesser or finishing sanders. You'll see a variety of routers and grinders, but no pilot or profile bits. The equipment includes pieces of every vintage, and every piece of it has been repaired, rebuilt, or refined. If there is one common trait in all these pieces, it is their compactness. John has always tried to work out of the smallest sufficient space, and his equipment is chosen accordingly. His machinist's lathe, for example, was originally designed for repair service aboard submarines. So the singular exception is all the more dramatic: a vertical lathe 18 feet between centers, disappearing into the roof trusses.

If John is comfortable with machines, he has little interest in mechanically proliferated ornament. He still occasionally makes components for architectural restorations, but steers clear of Victorian gingerbread.

John Macnab in his Halifax, Nova Scotia workshop, surrounded by some of his explorations into the spiral.

ALL PHOTOS BY CHRIS REARDON EXCEPT AS NOTED

Halifax has a good stock of Georgian buildings and modest 19th-century houses built in a pre-industrial vein. People restoring and repairing these buildings come to John for handrail components gotten out by hand, balusters turned by caliper and eye rather than on a copy lathe, or straightforward joinery enlivened by simple beads. What John tries to emulate in this older work are clean, intelligent solutions executed by a steady hand and a sure eye.

John started using the lathe to produce balusters, chair spindles, drawer knobs, and other secondary furniture components. As these elements were accessory to larger pieces, the lathe was an accessory to his shop. Over time, John became more intrigued with the lathe as a tool in its own right, and eventually he produced a series of fine tilt-top tables in which turned top and spindle are the predominant design elements. He also made a number of bowls and chalices based on Georgian silverware, in turn based on classical profiles. These pieces stand as the culmination of his built, period-based furniture and his built furniture. It seems that just as he began to experiment with freestanding turned objects John was also ready to venture beyond the dictates of style and precedent.

FORM AND CONTRAST

No matter when or where it was made, the formal vitality of a turned vessel resides in—or emerges from—a series of oppositions: between surface and volume, cavity and convexity, volume and space, edge and surface, and so on. In John's bowls the formal elements are drastically simplified, so the contrasts between them may be heightened and played off one another to create a complex work.

An important example is the "Blue and Gold Bowl." It presents a composition of graphic simplicity: the ample, almost spherical body, the conic base, the deep blue enameled interior, the gilt rim. Yet few people come upon this piece that don't pick it up to continue their contemplation. They are intrigued by the smoothness of the outside surface in their hands, against the rough-milled surface of the interior that they hold in their eye. Perhaps it occurs to them that while the textured interior is actually a constant color, the silky exterior is richly-figured burl. Maybe they see that the gilt edge that separates inside and out profiles in miniature the bowl itself: a plump convex curve atop a raking straight line. Maybe their gaze takes them to the jagged edge of the foot, where a tiny portal of exposed burl invites the beholder into the underworld within the foot, like a Mannerist grotto in a classical garden.

Every turned vessel emerges from the primary tension between the plan, a mechanically prescribed circle, and the section, freely developed by hand and eye and brain. Seen in this light, a turning integrates David Pye's "workmanship of certainty" and "workmanship of risk." In an ornate work the creative tension between these two aspects of a turning may be lost. A profile built up of molded components can suggest a hesitancy on the part of the turner, who has committed their tool to no more than one short gesture at a time. The mechanical component may overwhelm the turner's contribution. In bolder, plainer works, the profile tends to read as a single extended intention. In these pieces the action of the human organism is equal to the dictates of the machine, and the two fuse into one form.

In the subsequent "Eggshell Bowl," the profile is a more lively curve, fattening in the middle and flattening toward the extremes. In this piece the tension between silhouette and plan is as acute as in a Doric capital. In all his bowls, the finish was always considered an integral material component. The eggshell bowl is perhaps the most striking example. The inside of the bowl is protected by a fine mosaic of fragmented eggshells. An egg provides hermetic enclosure for a time of gestation, but its ultimate function is to be shattered and outgrown. The mosaic seems to invite contemplation of wholeness and disruption, of

OPPOSITE PAGE, TOP TO BOTTOM—
"Table" (1992); soft curly maple, H: 25". The legs are a multi-axis spindle turning.

"Chalice" (1993); bubinga burl, ebony; H: 7½". Made from three turnings threaded together.

"Blue and Gold Bowl" (1991); hard maple burl, gilding, paint; H: 10" x D: 9".

"Eggshell Bowl" (1991); hard maple burl; H: 10" x D: 12".

"Split Vase" [two views] (1996); walnut veneer core, ebony; H: 15" x D: 4".

interiority and emergence, embryonic idea and spatial realization.

OUTSIDE THE RACE

John's "Blue and Gold Bowl" had come to the attention of the noted furnituremaker Alan Peters, who was deeply impressed with the piece and practically insisted that Macnab abandon historical work and focus on his own explorations, thus providing impetus for a whole series of bowls. Studying the turned vessel as a pure form, John confronted the same conditions that vexed many more established turners. It appeared that in strictly formal terms, the possibilities of faceplate turning had been pretty well mapped out, and there was no obvious way this envelope needed or wanted to be pushed. Along with his peers, John experimented with elaboration of the turned form. In several bowls, the rim is serrated into toothed and stepped profiles. In others, he carved into the surface rather than the edge. In a more mathematical direction, John began to explore the topology of enclosed spaces. Splitting and rehealing certain hollow turnings, he created a series of manifolds.

A piece that combined many of these themes was the "Bird House." With the profile of a human face, drilled out to create a multi-chambered interior and inhabited by wildlife, this piece offered a surrealist take on the relationship between mind and nature. It also began a new direction for his work. By this time Macnab had traded in his 36" General 160 lathe for a much larger machine. Using his new lathe to its capacity, he turned "Pivotal Man" from a massive birch timber. It is a rotation of the full-size frontal profile of a human, sheared along several diagonal planes and reassembled.

Although his work was now gaining more attention, Macnab was not really satisfied: he was still trying to find an authentic voice of his own. His regard for the circle as the original form approaches the mystical, so performing secondary operations on a turning seemed to him fussy or forced. On the other hand, he has mused that a turning is nothing more than the rote replication of a bearing race conceived and crafted by other minds. Somehow John wanted to move beyond the evident limitations of the lathe as a form-giving device, while at the same time approaching more closely to its nature. He gave up on the idea of taking turned pieces off the lathe and working them over. Instead, he focused on the lathe itself, where it came from and what it could become.

CLOCKWISE FROM UPPER LEFT—
"Bird House" (1995/96); cedar; H: 30" x D: 12". The bolts are for mounting to a post.

"Pivotal Man" (1988); yellow birch; H: 68". Turned, split, and re-joined.

"Work Table" (1995); wenge, red oak; 29" x 42" x 84".

BETWEEN CENTERS

Compared to his refined bowls, "Pivotal Man" is a more elemental kind of work. It is also a spindle turning. Whereas the faceplate lathe can be seen as a fairly recent derivative of the potter's wheel, the spindle lathe is a more primitive device, representing the origin, and in some sense, the essence of woodturning. Contemporary woodturners have steered clear of spindle turning—and not without reason. The faceplate lathe, like the

Gears wheels, toothed belts, and an indexer guided motion on this version of Macnab's horizontal lathe.

Macnab with "Conical Column #0" (1998); elm, paint; H: 124". Turned on the 8' lathe in three sections and socketed together.

Detail of "Conical Column #0".

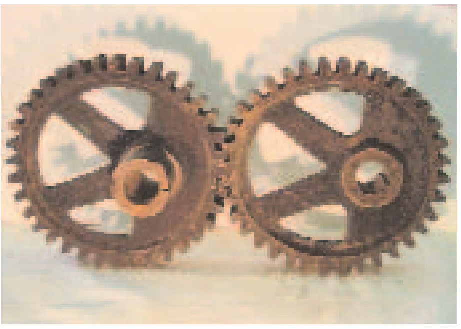
potter's wheel, creates an inherent base for a free-standing form, a form which can be stood on a pedestal and enjoyed through the five panes of a real or imaginary glass case. Spindle turnings, on the other hand, typically come to life as a column, a rung, or a baluster—that is, as a secondary component of a larger structure. These simple physical facts imply objects embedded in the everyday environment, not those of the fine art world. Nonetheless, John was fascinated with what seemed to him the essential application of the lathe, and he was determined to bring it to contemporary attention.

The lathe seems to originate in ancient Mesopotamia. In Iraq even today, the spindle lathe has a role to play in the built world, as window grilles assembled of innumerable elaborate spools break up the harsh desert light. The geometrically determined axiality and circularity of the spool-ends and of bored holes allow the turned pieces to be efficiently mortised together, while the free development of the profile of the spool creates complex edges and surfaces which enrich precious shade into a soft brocade of diffuse shadows, diffractions, and penumbras. Much later, as civilization spread northward, Europeans learned to use the lathe in a complementary fashion, creating stands for candles whose base, axis, and socket were geometrically reliable, but whose highly elaborate profiles were designed to propagate and enrich precious candlelight. Not surprisingly, you are as likely to find a 17th-century candlestick in John's studio as a postcard of Middle Eastern screens.

For millennia, the spindle lathe was used in this way, integrating in each turning the freely-developed profile and the geometrically-determined structure of a rotated form. It can also be observed that in almost every application, turned objects were utilized in multiples. Before the Industrial Revolution, this was a remarkable and wonderful thing, but we quickly tired of replication when it became too prevalent. Today, after a century and more of industrial production, we are more attracted to the exceptional and the unique. Work based on replicated elements has highly specific meanings in present day discourse, therefore, but these were only of slight interest to John.

The machine that allowed John to turn "Pivotal Man" is a venerable Pickles and Ransome lathe, 8' between centers, robust and vibrationless. This is a truly industrial era machine, intended for making foundry patterns. It has vee ways and a longitudinal rack, allowing a post-mounted tool to be cranked steadily along in parallel to the lathe axis so as to create a perfect cylinder. This simple device marks a significant point in the history of the lathe. Whereas every turning embodies circularity and straightness, in pre-industrial work the straightness remained implicit as the axis of a workpiece. Now, the parallel action of the toolpost could give the axial line explicit and outward expression.

The geometric cylinder can be seen as an elementary particle of the industrial world. It had scant application before the mechanization of work, but in a matter of decades it proliferated in the form of power



"Spiral Column #2" mounted on outboard shaft of Macnab's 8' lathe; an end mill bit mounted in a variable speed router does the cutting.

Embedded logic: a large pair of elliptical gears.

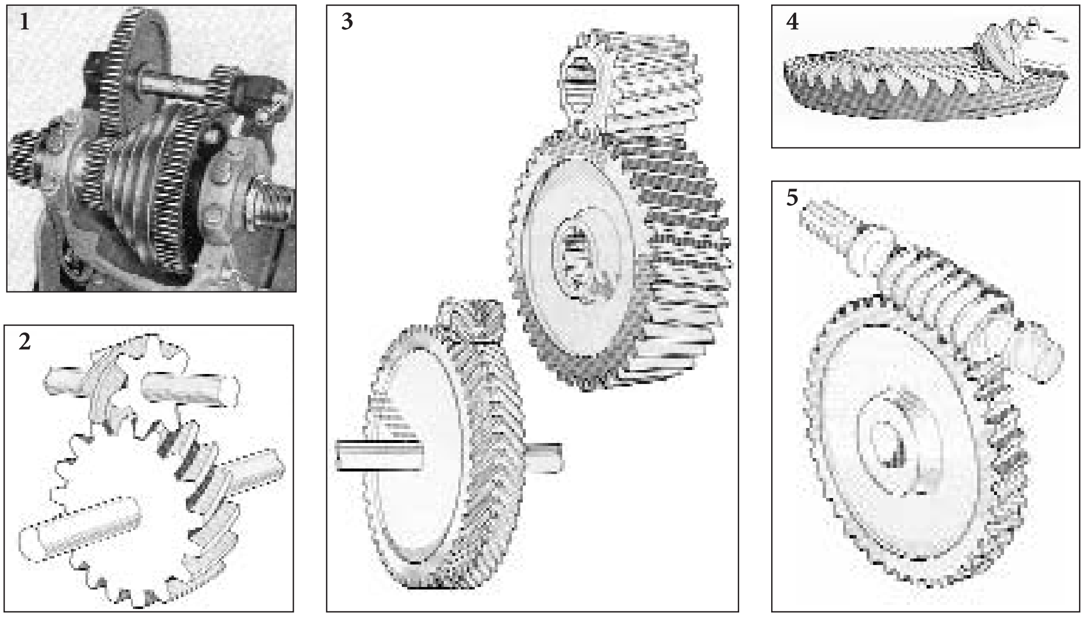
"Spiral Column #2" (2000); pine, paint; H: 73".

"Spiral Column #7" (2001); spruce, paint; H: 64".

transmission shafts, sheaves, bearings, bolts, rivets and countless other artifacts. And at the very heart of this revolution we find the steam engine, which depended on cylinders as exactly straight as they were round, while the frontiers, for better or worse, were dominated by cylindrical gun barrels. The machine lathe provided the finishing touches to all this, but as long as metal components were cast, they would have to be prefigured in foundry patterns and in the lathes on which these were made. The craft of patternmaking has been largely supplanted by other processes, and the production of basic industrial components is largely automated. Nonetheless, the cylinder remains the embryo of the whole machine language: of forms that are determined by rotational and rectilinear motion in all respects, in profile as well as in axiality and cross-section. But while we are conditioned to think of the machine language in these simple manifestations, it actually has generated far more complex forms.

An important step in the evolution of mechanical form is the leadscrew. Maudslay in England and before him Nartov in Russia devised lathes in which longitudinal motion of the tool is driven by a helical element parallel to the lathe axis. Used simply as a leadscrew, the helix has the power to replicate itself. Because the half-nuts driven by the leadscrew average out manufacturing irregularities in the screw itself, the progeny may be more precise than the parent. Thus, Nartov's and Maudslay's machines became the direct ancestors of every leadscrew and every machine in existence. John's work can be seen as the particularly illustrious offspring of this influential family tree.

Used in multiples and in conjunction with other elements, the helix can coordinate rotational and longitudinal motion of many kinds. The form-giving potential of gears and screws reached its epitome, perhaps, in the universal milling machines of the mid-20th century. As it happens, John's studio is in a marvelous cluster of shops and studios located in an old waterfront warehouse. A neighboring woodworker with similar interests in the history and possibilities of mechanically-determined form purchased a Brown & Sharpe #2 Universal Milling Machine (3-axis). This is essentially a geometric laboratory; a device in which the simple ideas of rotation and translation can be configured to generate a variety of outcomes, limited only by the machinist's skill and imagination. The machine would have been used to create non-circular slots and cams, progressive tooth patterns, helicoidal gearing, and other complicated forms. On this machine John contrived some tapered table legs that were spirally fluted, and made in counter-rotating pairs.



One of the basic mechanisms of the machine is the gear wheel, used to transmit rotary motion and force. At upper left are spur gears (1), which transmit motion between two (or more) parallel shafts. Parallel helical gears (3), with teeth inclined at a small angle to their axis of rotation, are smoother running than spur gears and are more suitable for higher speeds. To transmit rotary motion at a right angle, various gear trains have been developed. These include crossed helical gears (2), spiral bevel gears (4), and the worm and worm wheel (5). A worm is a gear with one tooth in the form of a screw thread.

For the first time, Macnab had used a cutter rapidly rotating on its own axis to interact with a more slowly rotating workpiece. In doing so, John was entering territory in which the hand-guided tool, Pye's "workmanship of risk," is completely supplanted by the machine-guided "workmanship of certainty." In spite of Pye's exposition of the subtlety and the sophistication achievable in, and demanded of, advanced work in this realm, Pye's thinking has never been wholly assimilated by the contemporary craft world, which is deeply rooted in the anti-industrial handwork movements of the 19th century. John ventured into this realm fearlessly and emphatically, as only someone in full control of the workmanship of risk could do.

MACHINIST AND MILLWRIGHT

Having generated tapered helices on a milling machine, John became intrigued with extending the tapered envelope of the helix into a cone. John recognized that giving the helix a fixed pitch (making it advance along the axis of the cone a constant amount with each revolution) would actually increase the "climbing angle" of the helix, so that just as it approached the point of the cone, the helix would become vertical, coinciding with the axis of the cone in its infinite extension. To make such a cone was not just an arbitrary exercise in geometry, but an attempt to delineate the infinite in a finite body. And to make it would require a new machine.

A large part of machinists' work is building jigs and fixtures to accomplish particular jobs, guiding their machinery to extend itself and its own capabilities. Every woodworker with a tablesaw is likely to use it to build sliding tables and what have you. In their own small way, they become a millwright: someone who not only operates a machine tool but who devises and builds them. As a hand woodworker who used power tools as an occasional expedient, John had had little interest in this field. But he returned from his experiments on the Brown & Sharpe mill ready to immerse himself in this art, poring over old textbooks and treatises concerning both its theory and the niceties of its practice. The theory of machine tools is straightforward, really, but the practice involves the management of friction, backlash, the complexities of cutting tooth form, the resilience and the brittleness of tool and of workpiece materials and countless other factors, all of which must be addressed and reconciled.

Theoretically, all that he needed to do to make his conical column was to control longitudinal and transverse motions of his lathe's slide rest in strict relation to revolution of the workpiece. This is childs' play to a machinist, who would employ a taper attachment to describe the shape of the cone. Whether this was an effective approach in wood and at the scale he had in mind was a question John debated with the various machinists and woodworkers who passed through his shop on a regular basis. Some opined that a longitudinal chain drive would be easy to install, and that the parts required for gear changes were readily available in a bicycle shop. Others mentioned servo hydraulics or more exotic options. John decided a leadscrew would be smoother, more powerful, and more reliable. And whereas some suggested a coordinated cross-feed mechanism, John was firm in his resolve that a non-parallel alignment of lathe axis and ways was a simpler setup that would give a more precise result.

He located an old leadscrew long enough for his big lathe and carefully installed it on the back side of the main castings. He removed the flat belts from his existing motor, and powered the machine with a smaller variable-speed unit mounted outboard. This motor drove the leadscrew, and a geared drive from the leadscrew rotated the headstock in lock step. The gear ratio of this drive was highly variable, as by that time John had acquired a set of used change gears. Finally, the headstock incorporated a large ring bearing salvaged from a radar transducer. Connecting the two parts of the bearing through a pin and an indexed plate, John was able to re-set the tool path for each of the flutes.

The blank for the cone was glued up of small pieces of elm salvaged from local trees. In the finished piece, the grain of the spiral fluting, the grain of the glue-up, and the grain of the elm itself are all discernible, entwined in a kind of dance. In the spirit of redeeming the fragments of tree, it became important to John to incorporate every piece in this new whole. Using all the material indicated a diameter and a length considerably larger than the lathe could handle. To accommodate the first dimension, John created a new headstock a suitable distance from the lathe ways. To accommodate the second, John made his cone in three sections. The pieces socket together like bell and spigot pipe, but in spite of the diameter of the whole having to vary as it passes through the joint, in spite of the indexing, the angle and the changing depth of the helical flutes, all the geometries flow perfectly from one piece to the next, and the circular seams are scarcely visible. The finished piece stands with absolute authority, the helix rising and straightening toward the apex precisely as envisioned.

The result was deeply satisfying. By his own account, John had been entranced with the rising helix ever since his first childhood visit to a barber's shop. Also, as someone who had done almost all his lathework with a gouge, making long continuous cuts, turning was essentially a helical process, and not a series of circular scraper marks. The cone articulated this spiral understanding of turning. John had also achieved something else, creating a form between centers that has but a single base.

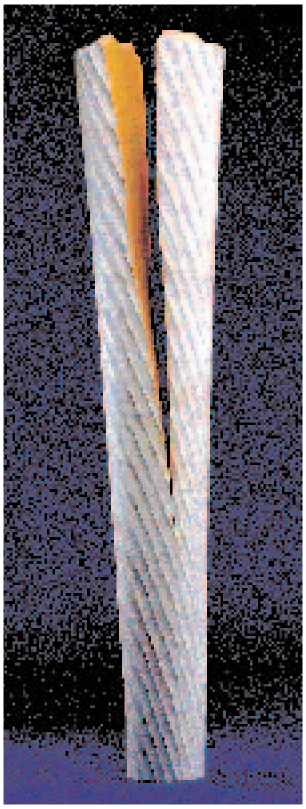
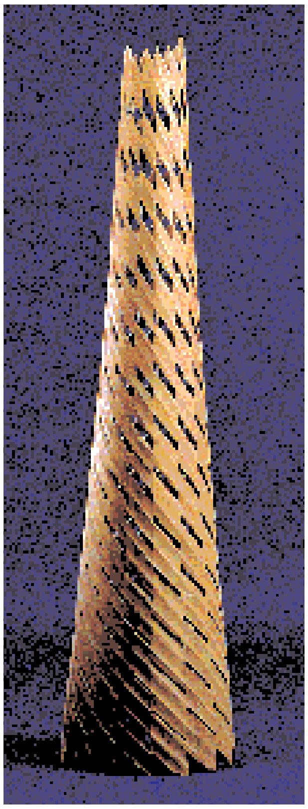
In this piece, John was approaching the world of ornamental turning. This highly specialized craft developed in the late 18th century as one branch of machine tool development. In ornamental turning, various mechanisms control the movement of the tool relative to the rotation of the workpiece, creating a variety of rosettes and other mathematical patterns. However, there is a world of difference in John's approach. Ornamental turnings have an additive quality, and ornamental turners describe their work as surface ornament cut into a primary form. In Macnab's work what might first appear to be a secondary level of fluting actually defines the major form. The shallow flutes of his table legs, for example, are not an embellishment of a pre-made form, but the traces of the cutters left as they create the primary form. The flutes integrate the path of the cutter, the advance of the table, and the rest of the set up into a unified whole.

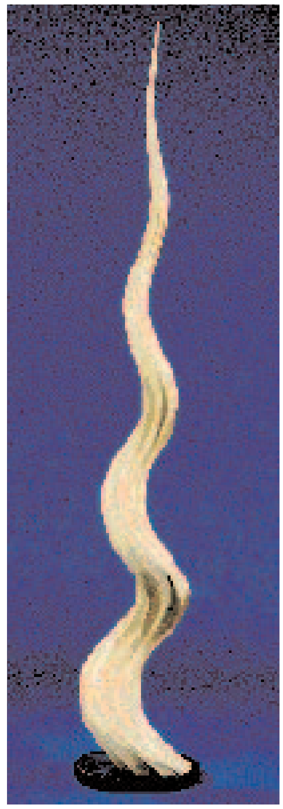
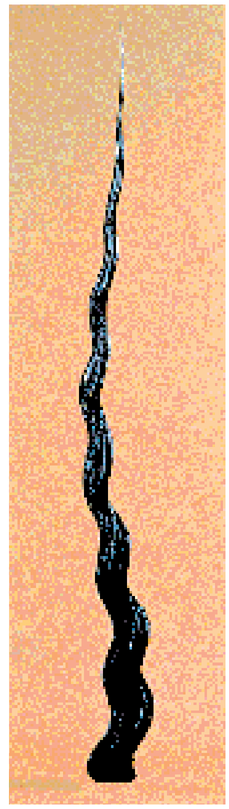
John's search concerns the nature of form and form-giving: what is it that nature gives to material? Does an artisan give the same thing? What is it that the mind recognizes in form, what is it that form gives back? These are the kinds of questions that John leads us to. Lying about his studio, John has bits and pieces of old mechanical calculating devices, in which complex functions are embedded in bizarre non-circular gears and peculiar linkages. One pair of massive elliptical gears is from a press of some kind: they define a slow powerful work stroke, and a rapid return. They remind us that form and information are closely related. Any machine embodies certain geometric ideas. If it is a measuring instrument or a computer, it generates information encoded as words or more typically numbers. If the machine is a tool, it imparts ideas to material, giving concrete form to abstract information. It has occurred to John that conceptually-determined form and mechanically-determined form were born in the same moment—on a Mesopotamian lathe. In some respect, this thought is the wellspring of his work.

GEOMETRICAL STUDIES

While he was dreaming up his new machine, John studied other ways of generating the complex cones with which he had become entranced. He began by stitching together some conoids out of cardboard panels. Each triangular face wavered about its long axis, and each wave was out of phase

Perched on a tractor seat that travels up the column, Macnab manipulates a 5½" sawblade mounted in a slow-speed buffer to control the cutting of the flutes.

with its neighbors, generating a torsion in the whole form. He also made armatures out of thin steel rod, and of counter-spiraling wood lattices; some were covered in fabric, some not. In one large fabric piece, the original striping of the fabric stretches itself into a spiral running against the expected grain, and straightening as it approaches the axis of the form. As in each of these trials, no matter what patterns were imparted to the material components, surprising results emerged from the whole.

All the while John was making his formal studies off the lathe, he visualized how even more elaborate forms could be traced out by the rotational movements of machine tools. He had in mind compound conical spirals: tapered corkscrews, in which the thickness of material approached a point in concert with the diameter of its windings. He imagined that not only was the corkscrew fluted but that these flutes, too, would wind about the material. He first tried to conceive of toolpost grinders moving steadily along a leadscrew, but moving in and out radially so as to generate the complicated forms he was looking for. This approach called for the toolpost to be manipulated by impossibly complicated mechanisms. John was looking for the opposite, where a simple system would generate complex results.

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"Double Helix" (1998); beech, paint; H: 53".

"Hammurabi" (1999); oak; H: 53".

Built-up hollow form for a spiral turning.

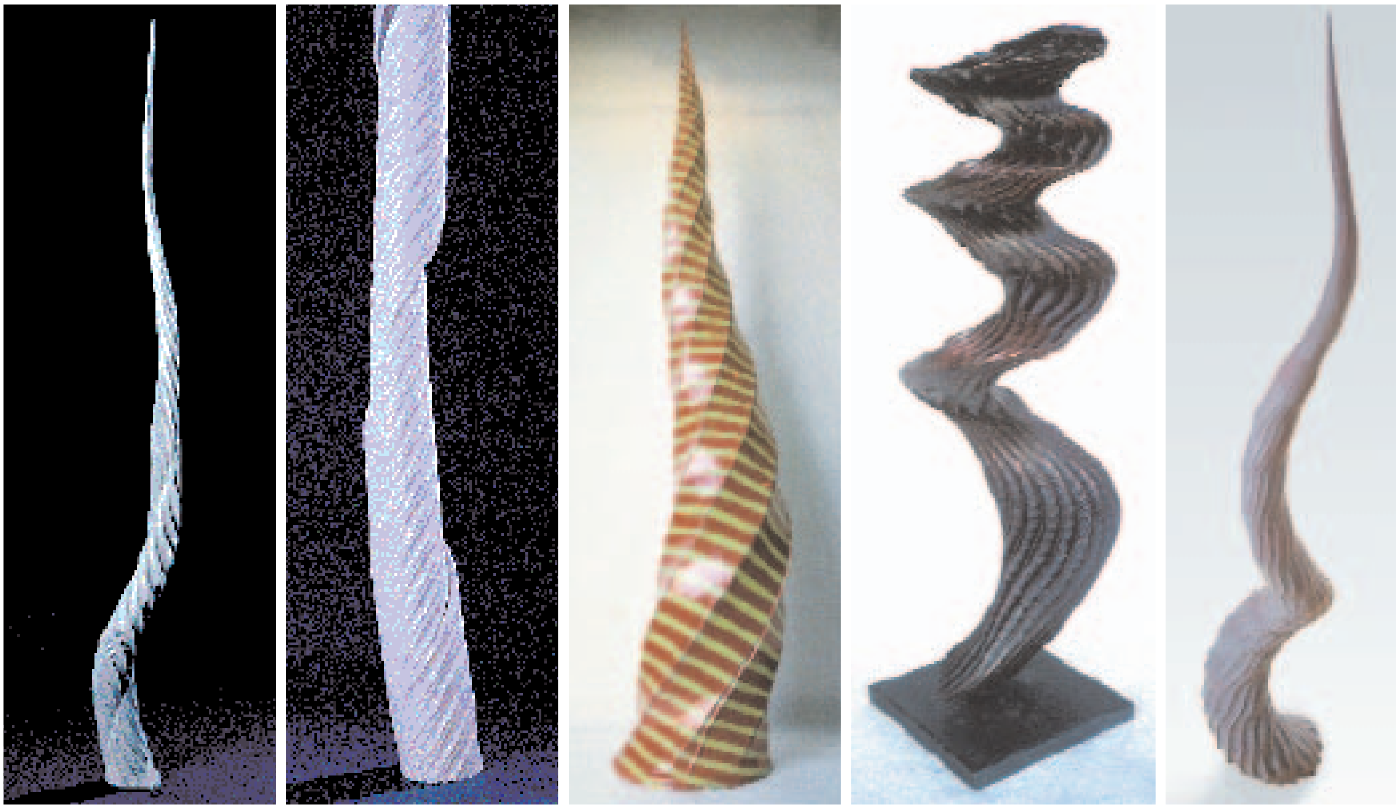
"Spiral Column #3" (2000); pine, paint; H: 66".

"Spiral Column #5" (2000); pine, paint; H: 77".

His breakthrough came by way of a friend's reading of Buckminster Fuller. Describing the moon's orbit around the earth, Fuller pointed out that it was not simply a circle or an ellipse; since the earth itself is traveling around the sun, the moon's path becomes a kind of toroidal helix. But then, the sun is following an orbital path within the galaxy, and the galaxy follows larger orbits in its own cosmic neighborhood, winding helix upon helix upon helix. Furthermore, Bucky reminded us, all gravitational orbits shrink over time. As the moon is slowly spiraling into the earth, and the earth into the sun, and the sun into the center of the Milky Way, their helical orbits trace out extended, compound, spiral cones.

John took up the idea of a planetary headstock opposite a fixed tailstock. Digging through his expanding inventory of salvaged machine parts, he adapted the headstock of his patternmaker's lathe to generate the requisite orbital motions. His faceplate now turned on the end of a short radial arm, driven by a planet and a sun gear. The rotation of the arm establishes the major corkscrew form, while the rotation of the faceplate generates the helical fluting. The faceplate is indexed, so that successive flutes may be cut. By changing the gearing that controlled relative speeds and directions of sun, planet, and leadscrew movements, he obtained compound spirals as varied as gently wafting flames, eroding seashells, and roaring vortices.

In purely formal terms, John has taken spindle turning well past its conventional limits, into territory normally associated with the turned vessel, and beyond. These pieces are not explicitly containers, but their corkscrew paths engage space as vigorously as the best of jars and bowls. A vessel also develops vitality and character in the way that it reaches outside of itself: anticipating a surface to stand on, contents to be placed or poured in, and hands to pick it up. John's new forms incorporate an analogous vitality as the various patterns



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"Spiral Column #6" (2000); pine, paint; H: 64".

"Hyperbolic Column" (2001); urethane foam, resin; H: 68".

"Fabric #1" (2001). A form was built from six coved, spiraling plywood sections; after covering it with fabric, cellophane, and resin, the form was removed.

"Whorl" (2003); tropical hardwoods; H: 21".

"Spiral Column #9" (2001); spruce, paint; H: 135".

and progressions they embody indicate convergence and conclusions just beyond the actual material.

To the possibilities of the compound conical helix he added another cyclical pattern, allowing his toolpost to move laterally as well as longitudinally, as governed by a decaying sine wave cut into a follower template. The resulting rippled forms have a level of muscular energy, like a catapult spring of twisted animal sinew. At the same time, he coarsened the surface of some of the pieces, allowing the rhythm of his plunge cutting to add another level of texture. To some extent, this returns the element of mark making, of overt handwork.

Sculptors from the fine art world became interested in Macnab's work, bringing their own preoccupations, but John's wish was for the pieces to be understood in a direct and concrete way as the interaction of mind and world, rather than through those interpretive conventions. Still, he was also intrigued. One of the main questions concerned the dimension of his work. His machine limited the size of his pieces to about seven feet. His larger pieces, therefore, fell in the realm of human scale, and were experienced quite differently depending on the bodily size of the viewer. This confused Johns intentions. At the same time, making smaller pieces and raising them on a pedestal imparted a sense of preciousness in the object that he also wanted to avoid. Laying them horizontal minimized the figural aspect but had other implications of no interest to Macnab.

The alternative was bold: to make even larger turnings, beyond human scale, to which all bodies would have a similar relation. But John was already at the limits of material possibility: were his delicate, waving, coiled forms to get any larger they would simply snap on the lathe under their own weight. The proportions of his studio, with its modest footprint and its towering headroom, suggested a more adventurous approach.

THE SPIRIT OF A NEW MACHINE

Macnab had been thinking for some time that to further his work he needed to build a lathe of specific intent. It needed to be larger and mechanically adaptable. A vertical axis would have several benefits over a horizontal orientation. It would keep bending stresses out of the mounted workpiece. It would allow the tool to approach to the apex of the cone much more closely. Finally, gravity acting on the tool, the toolholding linkage, and the vertical lead screw would automatically load the system against slop and backlash.

John began this project by searching for a suitable leadscrew. Through an online sale he had one shipped from Wisconsin. Next he build a vertical framework based on ready-rack uprights, solidly integrated with the building structure, much as in a 19th-century mill. The lathe ways are elevator guide tracks salvaged by a friend in that particular business. There is a tractor seat attached to the saddle so that as the toolpost and rotary cutter climbs the leadscrew, John is there to tend to it and to provide any plunging action required.

It is difficult to picture the cutting action of this tool. It is difficult to imagine orchestrating the gears and belts and linkages to describe the desired geometries. But to see

PHOTO BY JANET KIMBER

An ensemble of work, old (#0, #8. #9) and new (the black spiral in the foreground). The new piece is called "12' overall" and weighs only 35 pounds.

the machine in action, it is even more difficult to believe that the machine could be physically operated. First of all, the forces and reactions generated fluctuate wildly: the combined action of the planetary gearing means that at one instant the workpiece is brushing past the cutter with hardly any interaction, then suddenly the material is sent crashing into the rotating tool, then there is a moment of calm as rotation and revolution appear to cancel each other out. The same cutting teeth need to operate effectively at every rate and angle of attack, and sometimes it does not seem possible for the non-cutting part of the cutter to get out of the way of the writhing column approaching, sometimes from the front, sometimes from behind. But somehow, John controls this wild whirling wrestling match. Even more astounding is that in his regard for material, John is very careful to minimize waste: these pieces in all their convolutions are cut from blanks which closely anticipate the final form and are largely hollow. The scale and flexibility of this machine has enabled John to explore territory he had never really conceived of before.

A tree arises from its seed and its site, derived from conditions pre-existing in the source. As in all natural form, the complex results are produced by a unique configuration of rather simple inputs. It is in this sense that John's pieces are felt to be organic: they are the intricate and elegant and surprising result of a handful of elementary movements. These movements are sometimes linear, sometimes progressive, sometimes oscillating. The motions and rates are all programmed into a compact mechanism at the base of the vertical machine. This headstock is a marvel of ingenuity. Resting directly on the studio floor, it requires a minimal supporting structure. Within this mechanism, Macnab has orchestrated any number of found machine parts, some progressive-diameter cable drums, various angle drives and gearboxes, toothed belts, roller chains, and the like On any given day the components will be configured quite differently. Perhaps the cable drums are being employed to gradually vary the helical pitch of the main spiral. Perhaps the straight axis of the major cone has itself been induced to gyre its way to the top. Perhaps John has cut his own elliptical sun gear, to impart another kind of rhythm to the whole. The ferment embodied in this machine is astounding and the forms it gives rise to are limitless in their variety, their richness, their vitality. Yet to the end what is so entrancing about the machine is how few and how simple the ingredients are that generate this geometric wealth.

Perhaps the headstock of this machine should properly be termed a rootstock, not only because it lies at the base of a vertical structure but because of the way in which it sends forth patterns and forms from embedded instructions. When Macnab works, he is not only an external agent, imparting his artistic intentions to a piece of material. He imparts information into the machinery of his rootstock, and this information once activated gives rise to a particular form. Although he may have anticipated the results in their broad outlines, it is clear that as the form emerges under his careful coaxing, he is as astonished and delighted at the results as any of us.

ASPIRATION

One immediately obvious aspect of this work is Macnab's frequent use of paint. Macnab applies paint much in the spirit of the Windsor chairmaker, who uses the uniform color to gathers all the disparate parts into a single form. The Windsor chair was traditionally dark green or black to stress silhouette over surface. Macnab avoids green as unnecessarily botanical, and has worked with black, but generally employs less easily identified hues that interact in some way with the color of the wood. Several pieces are white specifically to counteract the organic reading with a sense of the human and cerebral, as achieved in the classical Doric column. Perhaps we should think of John's work as condensed architecture rather than a peculiar class of sculpture. Both the rigor with which it embodies geometry and its aspirations beyond geometry are traits more easily associated with architecture than sculpture. In many pieces the formal connection is quite direct. His first cone exhibits a transition from later classical fluting to the original Doric form, the fluted white columns also make strong classical references, while in others the reference to Bernini or to Borromini or to Danish church building seems inescapable. But as with the organic allusion, the architectural analogy has more to do with action and process than form.

As a contemporary fine art, sculpture is understood to be a linguistic enterprise, in which each piece of work acts as a bookmark in the larger discussion carried out in lecture halls, curatorial essays, and books. In this realm, artisanship merits only incidental consideration. While large projects on the scale of landscape become a feat of organization and publicity, even their success as art seldom depends on technical success or technical challenge. In architecture, on the other hand, the ingredient of *techne*—craft or skill— remains vital. And *techne* is clearly central to John's work.

The spiral is one of those primal forms that bridge the linguistic and the a-linguistic realms. It is associated with inspiration and spirit, not only in etymology and in visual symbolism, but also in material fact. In architecture the spiral appears above all in church spires and in works like the mosque at Samara, or the Tower of Babel as it is most often pictured. It appears there not only as a culturally-determined symbol of a historically-determined idea. It is a self-supporting ramp, a simple expedient, nothing more than the material trace of humans reaching outward from the earth on which they are rooted—and nothing less. Some of the more simplistic commentary on John's work has presumed to see phalluses, much as they have been seen in obelisks and other kinds of vertical elements. But the aspiration embodied in these pieces is universal; if they are to be read as pictures at all, John's columns evoke our spinal response to gravity, anchored in the soles of our feet and extending upward from our skulls to places we can indicate but never illustrate.

Where John's researches will lead cannot be predicted. The lathe of specific intent has generated more possibilities than he has had time to pursue. In his studio today you will see pod-forms coming to a point at both ends, spirals collapsing upon themselves and disappearing into themselves. One piece on a back shelf indicates a whole other direction: it is some kind of an anti-cone: a hyperboloid of sorts generated by imparting a different planetary motion to the headstock and the tailstock of the lathe. The differential actions are reconciled or collide in a rupturing and a healing of the surface that defies all description. But to explore this form further is only one possibility among many. Nobody can say what will appear there next week.

In John's own account, this work was sparked in his childhood, in his fascination with a barber's pole, in the mysteries of where the red and blue helices came from and where they went. He has never shied away from that fascination. Where many of us are trained to pursue knowledge in the mode of the engineer, considering only those things that can be safely ascertained, Macnab approaches his work in the mystical vein described by Valery, taking joy in what lies just beyond the knowable.

Ignorance is a treasure of infinite price that most men squander, when they should treasure its least fragments…

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