

Fleshing Out Those Textbook Bones

Why 'diagram' is a dirty word

By KATRINA VAN GROUW

IT WAS ALWAYS A PIGEON. That is, if it wasn't a chicken. But almost always, it was a pigeon.

Your friendly neighborhood domestic pigeon; that middle-of-the-road, generic bird. Easily accessible, devoid of biological eccentricities: It doesn't swim, it's not a bird of prey, and it perches in trees, thereby having the full complement of toes. The perfect textbook illustration.

And on that subject ... Excuse me, was that a yawn? I'm not surprised. The term "textbook illustration" conjures up memories of monochrome outlines in ink-stained tomes, complete with a string of unintelligible names, right? Doleful recollections of high-school biology classes and that weary trudge through the animal kingdom from amoebas to apes.

You might get an animal's stylized position—a side view, maybe, with one limb raised out of the way and the other not shown at all. Forced into unnatural conformity, the textbook pigeon clearly displays all the parts necessary for the passing of examinations—but nothing else. There's no modeling to hint at its being a solid object, no light source, no shadows. In fact, there's barely any three-dimensional information whatsoever. It's a diagram.

Incidentally, there are well over 300 breeds of domestic rock pigeon, and—not including the multitudinous permutations of color, markings, and feather structure—many of those are so anatomically extreme that you would think them separate species altogether. Darwin said that, so you don't need to take my word for it. And since Darwin's time, selective breeding has made some varieties even more bizarrely out-

landish than they were 150 years ago.

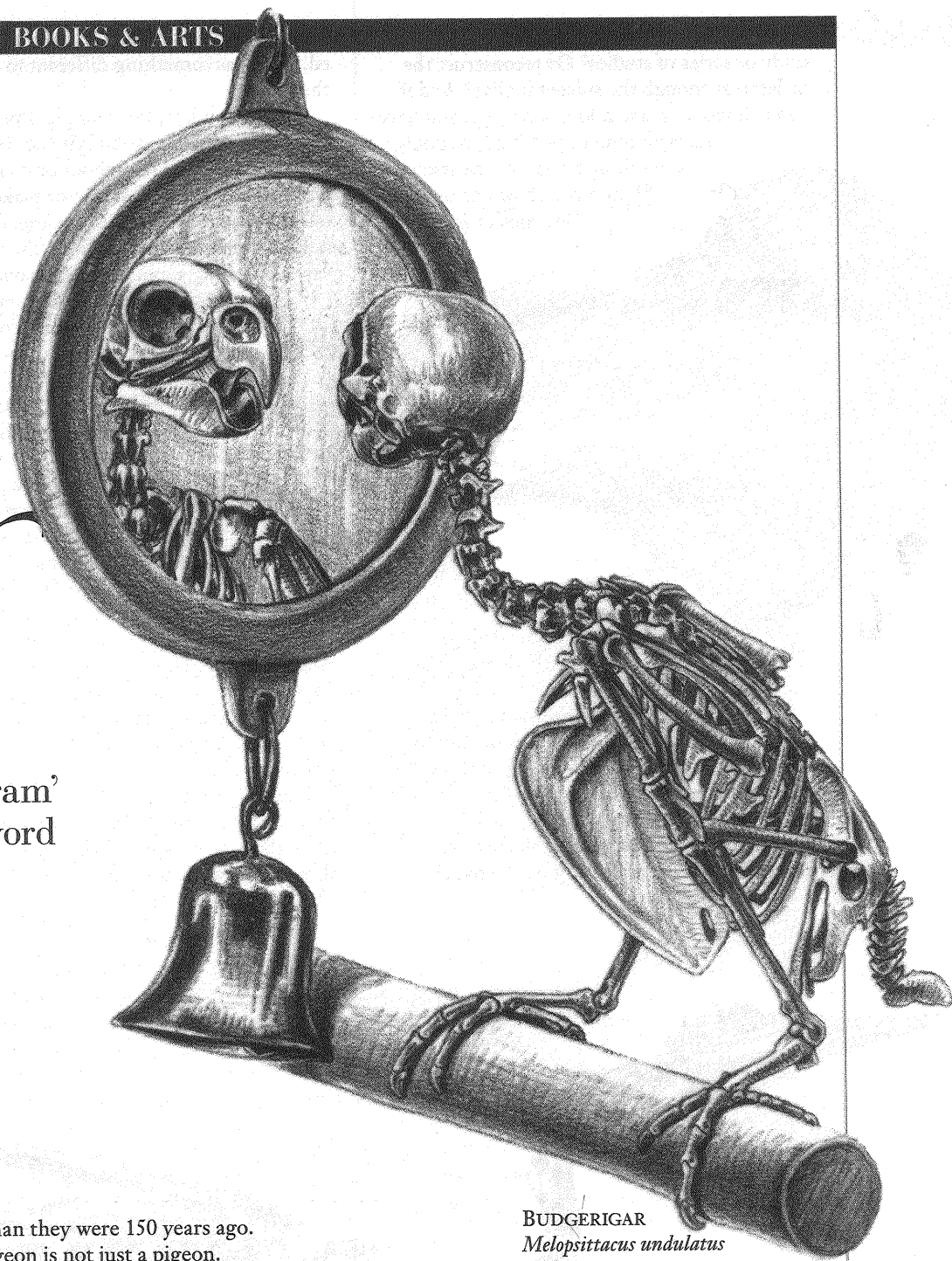
So a pigeon is not just a pigeon.

And a textbook illustration is not just a textbook illustration—or at least it needn't be.

What goes for our not-so-predictable pigeon can be equally applied to the illustrations themselves. Why should we deliberately opt for such soulless imagery? Surely education and inspiration go hand in hand, so why shouldn't scientific illustrations double as works of art?

Things haven't always been this way, though to be fair, the scientists of past centuries possibly viewed their exquisitely modeled engravings and lithographs with much the same boredom as does the modern student. Those images were packed with information, however, and while it may not have been deemed important to be that intimate with the pitted exterior of an individual bone, it certainly makes a visual impact, if only for the appreciation of the skill involved. George Stubbs, the celebrated author and illustrator of *The Anatomy of the Horse*, even invented his own engraving tools so that he could faithfully represent bones' textured surfaces.

Perhaps it's because of my fine-arts background, or the "old school" drawing tutor I had in my early years, but when I see two parallel lines, I want to be persuaded that there's something solid between them. I suspect that what



BUDGERIGAR
Melopsittacus undulatus
Skeleton

separates me (along with many of my historical counterparts) from the majority of textbook illustrators out there is that I work from real specimens, while the pigeon diagram in the latest curriculum title is doubtless a copy of a copy. Let's face it, illustrators are poorly paid, so who wants to dissect a bird, or anything else, for peanuts?

There's a sense of exploration in drawing real things, though—a voyage of discovery over the surface of an object, where you can reveal and describe details that you wouldn't see otherwise; things that a camera could never expose. Areas concealed in shadow within the rib cage, for instance, or the thickness of a bone suggested by the choice of a line. Whether you're drawing from observation, knowledge, memory, or imagination—or a combination of all four—drawing is essentially a creative, intellectual process. The objective drawing, like the generic bird, is a myth. There's no such thing.

Thus a plethora of choices open up: Do you show your bird looking dead, as though it's been freshly dissected, or even lying down? As a

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study or series of studies? Or reconstruct the skeleton as though the subject is alive? And if you choose to make it look alive, will you have it just standing or perching, or doing something typical of the species?

Should you show any imperfections or individual characteristics—things that will identify it as a particular specimen?

Do you use strong light to give three-dimensionality to the whole? Or modeling to show the three-dimensionality of the part? And if you choose strong light, will you include in your drawing cast shadows, placing the bird in its own space, or have it floating on the page?

Every option is an opportunity to be exploited. Each has something different to say about the subject.

Take my budgie, for example. I've drawn him looking in a mirror, as budgies do. No matter how little you know about bird anatomy, just the presence of that mirror makes it obvious that you're looking at a budgie, if you're familiar with this bird at all. So the drawing says something about budgie behavior, and, most significantly, it shows what the all-important skull looks like, from the front as well as from the back. Budgies, like all members of the parrot family, have very distinctively shaped skulls, so the added reflection in the mirror conveys vital information. Oh, and it's a fun drawing, too.

Happily, most people see it that way. A few think it poor taste to inject humor into a deceased bird. One enlightened individual compared it with Vesalius's 16th-century engraving of a human skeleton contemplating a skull in his famous textbook of human anatomy, *De Humani Corporis Fabrica*. Just about everyone remembers it.

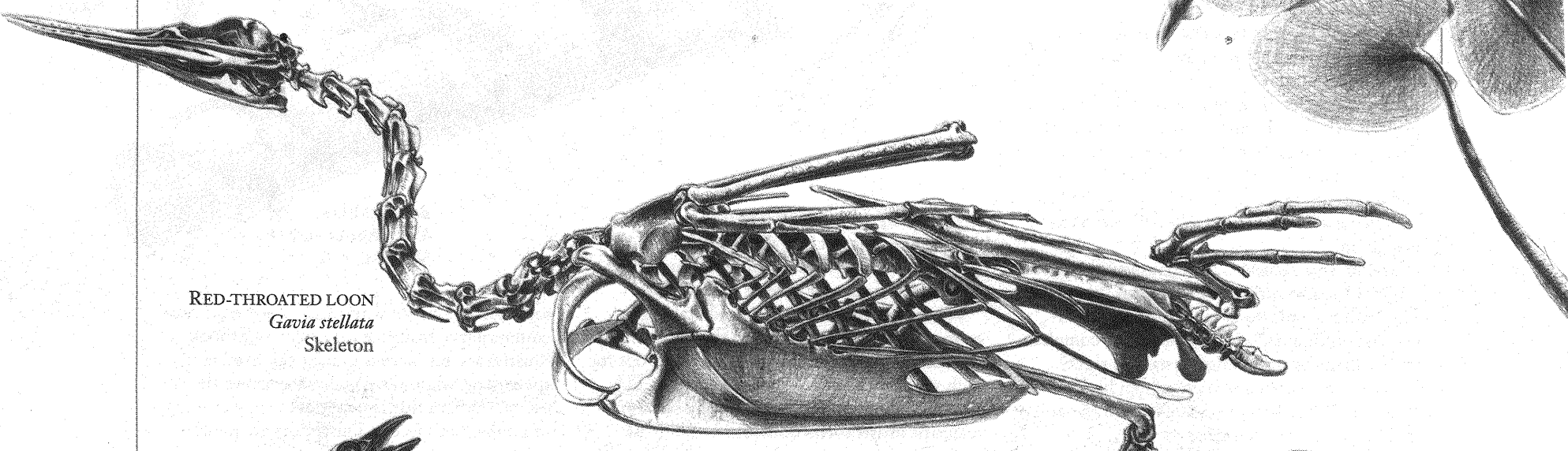
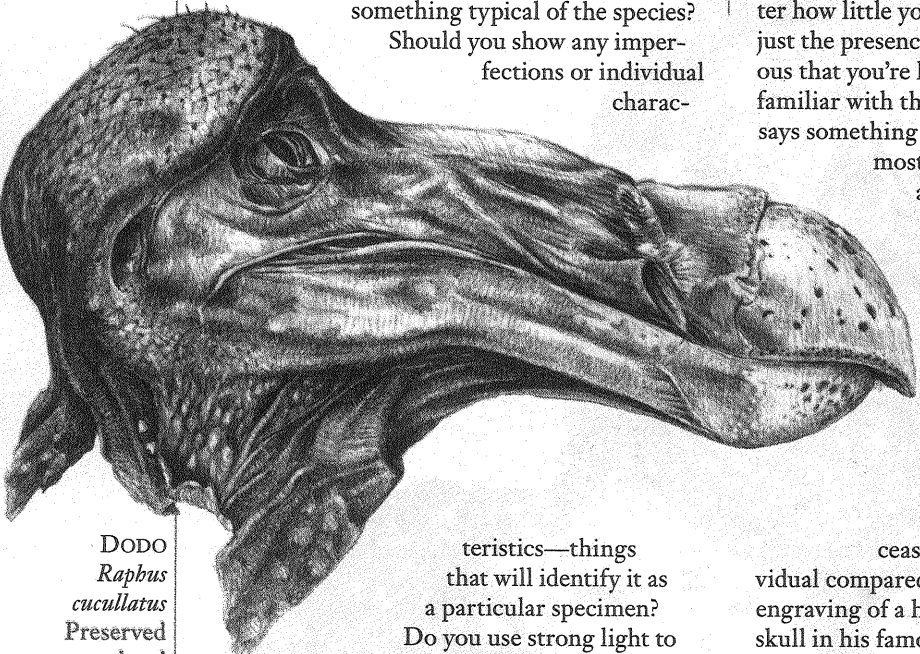
The budgie's just one of 385 anatomical drawings in my recent book, which is essentially about evolution and adaptations. It's more about living birds than dead ones. Only two

birds are portrayed dead; a handful are dissection studies; many are objects *in situ*, like skulls or feet shown as though on a surface, with accompanying shadows. A few are "warts and all" historical specimens, like the extinct great auk shown incorrectly mounted and with the gaping hole in his skull where the poor bird was bludgeoned to death, or the one-and-only bit of genuine dodo skin in the world—dried, burnt, and featherless. I've avoided jargon like the plague, so there are no keys and no pointy arrows. Call these diagrams and I'll sue.

Of course, at some point, those of us taking exams do have to name all the parts. But I for one would prefer to be visually stimulated in the meantime. After all, the natural world should incite wonder, not tedium. There's plenty of room for artistry in every scientific illustration. For me, there is only one D-word: drawing.

Katrina van Grouw is a former curator of the ornithological collections at London's Natural History Museum. The accompanying illustrations are from her book *The Unfeathered Bird* (Princeton University Press, 2013).

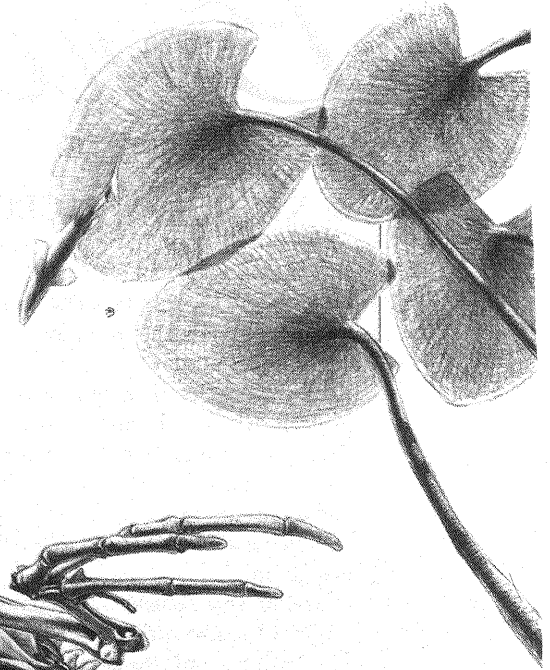
DODO
Raphus cucullatus
Preserved head



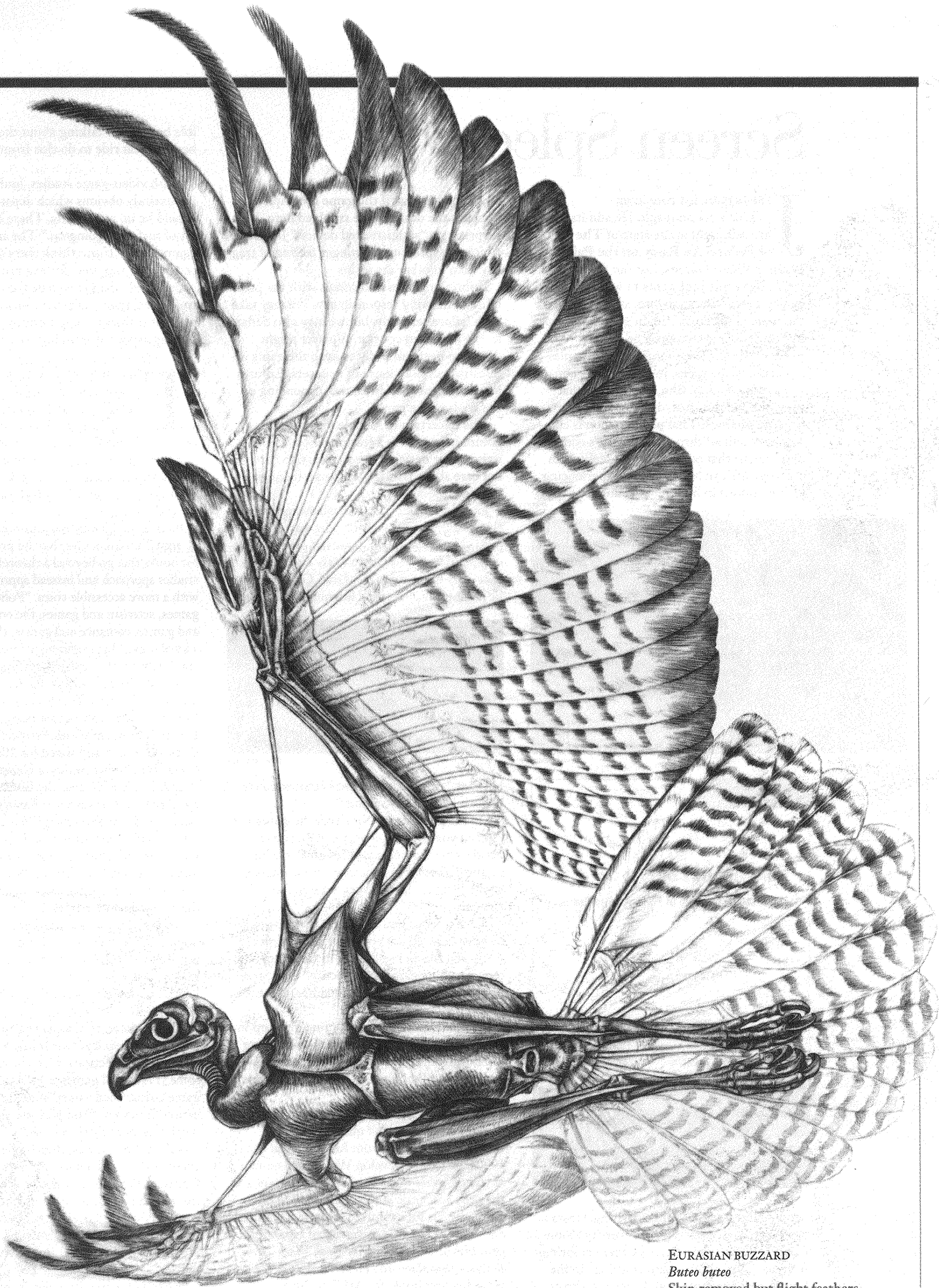
RED-THROATED LOON
Gavia stellata
Skeleton



TRUMPET MANUCODE
Phonygammus keraudrenii
Bird in display posture with skin removed revealing its coiled windpipe



GREAT AUK
Pinguinus impennis
Skeleton with unnaturally expanded rib cage; back of the skull shows where the bird was bludgeoned to death



EURASIAN BUZZARD
Buteo buteo
Skin removed but flight feathers
left attached

Screen Spleen

JESPER JUUL is a sore loser. That's not an insult. He admits it himself, right at the start of **The Art of Failure: An Essay on the Pain of Playing Video Games**, just out from MIT Press. But while Juul wants to win at video games, he also wants to lose, at least some of the time. "I dislike failing in games, but I dislike *not* failing even more," he writes.

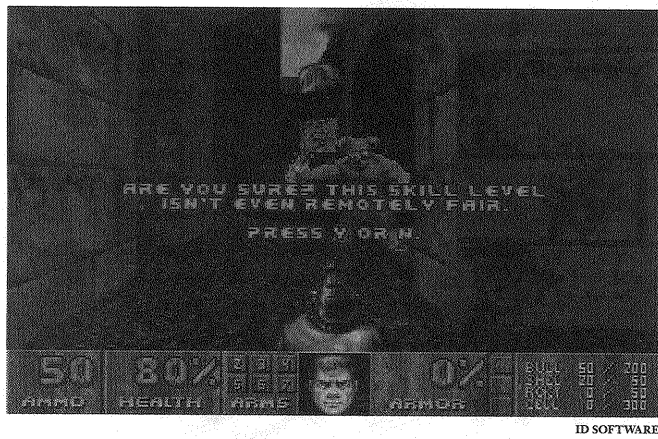
This "paradox of failure" in video games has parallels, he notes, in the ways we consume tragic fiction, film, and theater that engender sadness, fear, disgust, and other negative feelings. That phenomenon is commonly explained through Aristotle's concept of catharsis: that our unpleasant feelings in everyday life can be purged by experiencing such emotions in fiction. This doesn't hap-

pen in real life. Juul discovers that if the game is completed, it means the death of the troubled hero. It's a surprisingly "sophisticated device," Juul says, which may produce a stronger feeling of tragedy than in other art forms.

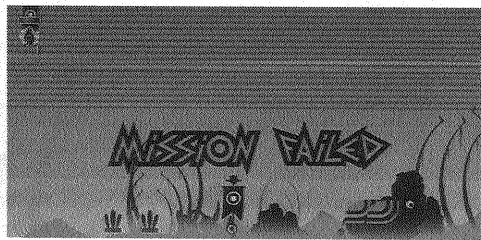
Failure in games also comes with the possibility of denying responsibility. We may take such failure seriously, but we may also deflate it. We may even court it. A player might decide to perform badly to keep the game interesting, explore more of its facets. Failures have different shelf lives, too, depending on the goals of the game.

The uncertain or flexible meaning of failure in games "is a feature, not a bug," he writes. Our decision, for example, to care or not care about failing grants us a freedom from consequences.

Juul also invokes freedom when considering the instrumentalist view of video games espoused by, for example, Jane McGonigal in *Reality Is Broken: Why Games Make Us Better and How They Can Change the World*. Games can be great for teaching and learning, Juul agrees,

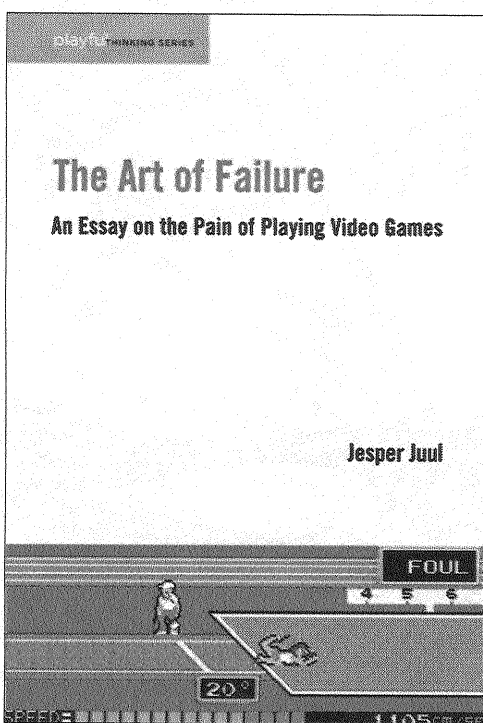


ID SOFTWARE



JAPAN STUDIOS

NOTA BENE



pen in games, argues Juul, a visiting assistant professor at the New York University Game Center: "Games do not purge these emotions from us. They produce the emotions in the first place." Frustration and anger bind players to games, along with fun. Video games involve the "art of failure," allowing us to both experience and experiment with failing.

Juul even spotlights a few games in which success for the player is not success for the fictional protagonist. Among them is a Western-themed game in which the player eventu-

ally discovers that if the game is completed, it means the death of the troubled hero. It's a surprisingly "sophisticated device," Juul says, which may produce a stronger feeling of tragedy than in other art forms.

On the phone from New York, he elaborates. "When you fail in a game, it's up to you to decide what that means. Whereas if you have a game structure in education or a workplace, it will be up to the manager to decide what it means."

What worries Juul is the idea that "it would be great if we all got points for whatever we're doing and this in itself might make things better." Recalling gamelike aspects of Wall Street behavior leading up to the 2008 financial crisis, he sounds a cautionary note.

Born in Denmark in 1970, Juul grew up in the first decades of video games, from Pong on. But his shift to studying the medium was unplanned. "I'm not sure I would have done it if I had planned it."

He was doing a master's degree in Nordic literature. "I wasn't quite loving it all the time." In breaks from his studies in the 1990s, he helped develop Web-based games. "I thought this was a completely different silo than my academic studies," he recalls. But gradually his focus shifted, culminating in a doctorate at the IT University of Copenhagen. His dissertation, *Half-Real: Video Games Between Real Rules and Fictional Worlds*, became his first book, for MIT, in 2005.

As a doctoral student in 2001, Juul says, he helped organize one of the first academic conferences on video games. "We were used to going to these literary-theory conferences that had 10 people in a room," he remembers. "And then we announced this and we had 100 participants. There was this incred-

ible hunger for talking about these issues. It's been a great ride to do this from the ground up."

With video-game studies, Juul says, "it's not entirely obvious which department it should be in, necessarily. There have been a lot of turf wars going on." The author is more ecumenical. "If you think there's a particular theory that is perfect for examining video games, and it happens to be the one you were trained in, then you're very lucky, right? But perhaps it shows you something about a self-serving aspect of thinking about it like this."

THE ART OF FAILURE is the inaugural volume of a new MIT series, Playful Thinking. Juul is one of its three co-editors, with Geoffrey Long, of Microsoft, and William Uricchio, a professor and director of the program in comparative media studies at MIT. The series promises books that are "short, readable, and argumentative."

In an e-mail, Doug Sery, in-house editor for Playful Thinking, says that the press is looking for books that go beyond a theoretical game-studies approach and instead approach games with a more accessible voice. "Politics and games, activism and games, the environment and games, romance and games, these are the sort of topics that might be of interest," he says, "preferably with something of a personal slant."

In addition to Juul's, a second book in the series is also just out: *Uncertainty in Games*, by Greg Costikyan, senior designer at Disney Playdom's Dream Castle Studio. Three more titles are signed and slated for 2014: *Possibility Space: The Strange Beauty of Games*, by Frank Lantz; *Works of Games: Art Games, Game Art, and Aesthetic Perspectives on Games*, by John Sharp; and *Gut Wrenching: How Games Shape Our Emotions and Transform Relationships*, by Katherine Isbister. Lantz is a scholar and game developer who directs NYU's Game Center, where Isbister teaches. Sharp teaches digital media at Georgia Tech.

Today more than 50 percent of the U.S. population are playing video games on a regular basis. (That includes everything from the simple game on your smartphone to productions with visual effects that rival Hollywood.)

The plethora of new players has pushed games in easier, less punishing, less time-consuming directions, much to the disgust of some traditional gamers. Traditional video-game culture had valued an extreme of dedication, Juul says. "You play the game to the detriment of everything else."

Still, as he outlines, there's plenty of nuanced failure and abuse out there for gamers. Consider Portal 2, in which players solve a series of puzzles while being insulted by a cruel computer called GLaDOS. Then there's the frank advice for the "nightmare" skill level in Doom: "This skill level isn't even remotely fair."

Instead of dissuading players with near-certain failure, that approach actually can be encouraging, he argues. It says this is so difficult that it is understandable and expected that you will fail. "There's a weird meta-playfulness about it," says Juul. "It's completely OK that you only get five seconds in" before you fail.

—NINA C. AYOUB