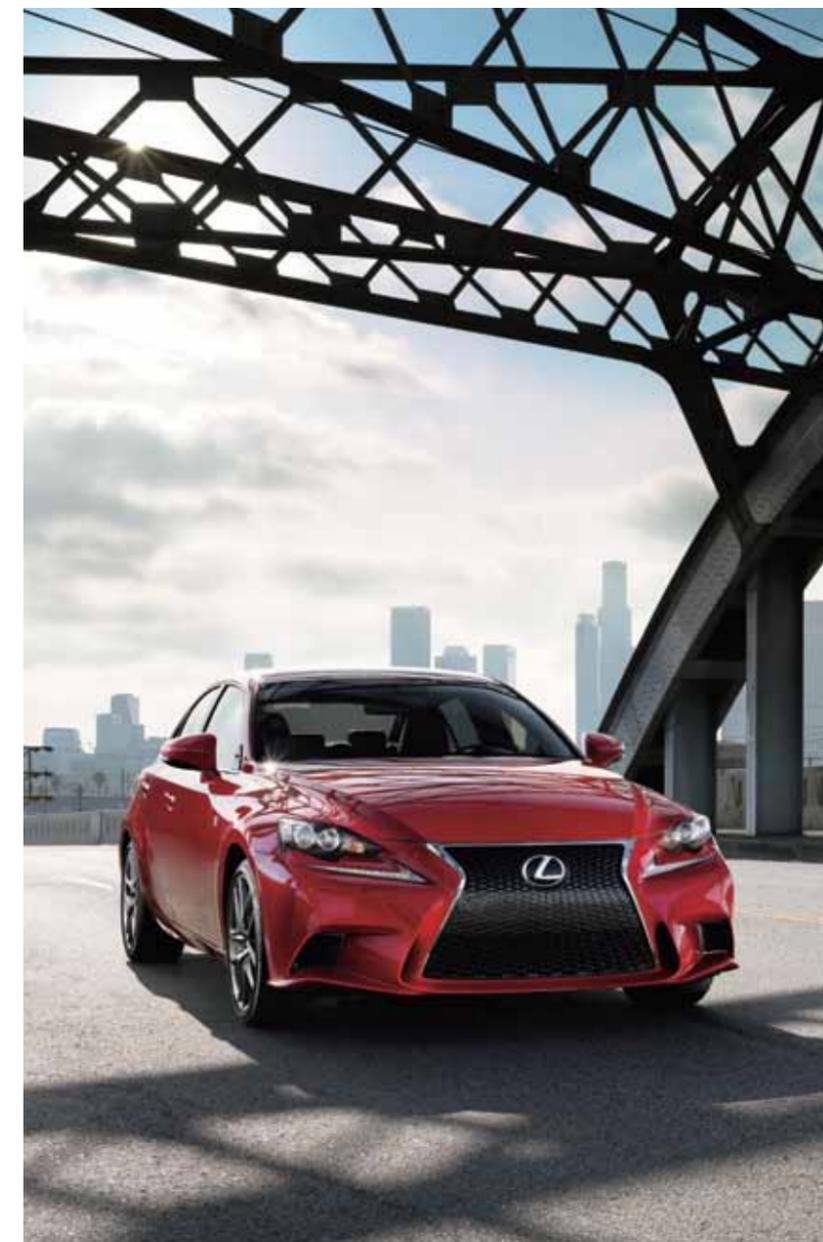


BEYOND

BY LEXUS

A JOURNAL ON DESIGN AND CRAFTSMANSHIP



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ISSUE 7 2015

THE UPDATE

MAKING TURBO

Introducing the Lexus IS 200t, a faster, more powerful, and ultimately more dynamic version of Lexus' most popular sedan.

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THE REVEAL

MIGHTY

The all-new Lexus RX is a bold, impressive, muscular machine. It is put through its paces at Japan's equally imposing Takizawa Dam.

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THE ROAD

BOY RACER

On the road with the talented go-kart driver Rashid Al Dhaheri, who, at the age of seven, is the great racing hope of the Emirates.

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SCIENCE NON-FRICTION

With the help of two German scientists, Lexus has developed its own hoverboard. We report.

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INTRODUCTION

Ever since Lexus got its start more than 25 years ago, we've dedicated ourselves to creating vehicles that combine groundbreaking technology and quality craftsmanship. This dedication is what has been driving us ever since; it is what has brought us to the forefront of car manufacturing and design.

This issue of BEYOND BY LEXUS yet again demonstrates our forward-thinking spirit. In a brand-new magazine section, the Update (p. 27), we introduce the turbo version of one of the most popular Lexus sedans we've ever crafted: the IS. Elsewhere, in our established but no less novel Reveal pages (p. 40), we unveil the bigger and bolder Lexus RX, as it masters the equally imposing Takizawa Dam. And we report on the Lexus hoverboard – a new and exciting piece of technology created in collaboration with a group of pioneering German scientists who are developing alternative methods of travel.

From road to racetrack, we always aim to exceed expectations with our grand ambitions and engineering. Our developing interest in the speedy world of motorsports is a good example of this uncompromising commitment. We like to drive in the fast lane, just like our youngest-ever hero for The Road (p. 66), Rashid Al Dhaheri, who, at the age of seven, has been winning go-kart races worldwide for almost half of his life. Or James Rossiter, Lexus' Super GT racing driver, with whom we caught up at Japan's iconic Fuji Speedway, where he was testing the Lexus RC F GT500.

With the seventh issue of BEYOND BY LEXUS, we celebrate the dedicated faces and pioneering minds who, like us, endeavor to go beyond the obvious. It's our pleasure to have you with us on this fast-paced, 100-page journey.

TOKUO FUKUICHI

President
Lexus International



BEYOND BY LEXUS

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Mikio Hasui's background is in art direction, but since he took up photography in the 1980s his award-winning work has been exhibited worldwide. A self-taught photographer from Japan, he shot the Lexus RX for The Reveal.



LAURENCE LOWE WRITER

Laurence Lowe is a Los Angeles-based writer whose articles have appeared in *GQ* and the *New York Times*. In Pit Stop, he reports on the still-valued position of the half-century-old Marina City parking garage.



ADRIAN GAUT PHOTOGRAPHER

NYC-based photographer Adrian Gaut regularly contributes to titles like *Vogue* and *W* magazine. For this issue of BEYOND, he flew to Chicago to shoot the Marina City parking garage for Pit Stop.



RYAN BRADLEY WRITER

Ryan Bradley has written for *The New Yorker* and the *New York Times Magazine*, among other titles. He took a trip from his hometown of Los Angeles to the Corbis Film Preservation Facility for this issue's Human Nature feature.



ALICIA KIRBY WRITER

Besides acting as a contributing editor at *Monocle*, Alicia Kirby has written for the *Wall Street Journal* and the *Sydney Morning Herald*. For BEYOND's Intelligence section, she browsed the globe's cuisines, exploring our interest in food fads.



GUSTAV ALMESTÅL PHOTOGRAPHER

Swedish photographer Gustav Almestål, who has shot for *Wallpaper* and *The Gourmand*, developed his interest in food photography during a stint living in London. He returned to the British capital to capture a special dish at the culinary hot spot Barrafina.

Illustrations by Robert Nippoldt

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From an exploration of intelligent luggage to a list of the handiest driving apps and a musing on Iceland's extraordinary classical musical scene, The Intelligence is a short, sharp investigation of global trends.

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Trollstigen is known as one of the world's most beautiful roads. British photographer David Ryle travels to western Norway for confirmation.

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The Lexus IS – the brand's most popular sedan – is back, but this time it's turbo. We take the IS 200t to the iconic Sixth Street Bridge in Los Angeles.

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The new Lexus RX is a supercharged version of its dynamic forebears. Bold but elegant, it is defined by sharp, distinctive lines both inside and out. We take a peek as it drives past the hulking Takizawa Dam.

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An iconic Chicago residential development has decorated the Midwest city's skyline since it appeared, like an architectural mirage, in the 1960s. Writer Laurence Lowe takes an intimate look at the still-brilliant, still-towering Marina City complex.



32 HUMAN NATURE INSIDE THE CORBIS ARCHIVE



Deep underground, in a facility fit for a Bond villain, some of the world's most iconic photographs are stored at sub-zero temperatures. Ryan Bradley wraps up and takes a tour around the Corbis Bettmann Archive.

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IN THE DEEP**

In the field of ocean exploration, Phil Nuytten is legendary. Jonah Weiner visits the man at his North Vancouver base to learn about one very special suit.

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Thought levitation didn't exist? Two German scientists are out to prove you wrong. Annick Weber meets the team behind a levitating train – and Lexus's very own, fully functioning hoverboard.

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MASTERS OF FORGERY**

In a factory 250 kilometers from Tokyo, a small team of highly trained craftspeople is creating some of the most celebrated wheels in the world. Sam Mitani visits the Takaoka wheel factory to determine how.

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**AT WORK WITH LEXUS
AT WORK WITH JAMES ROSSITER**

James Rossiter is of great importance at Lexus – an experienced racer, he is this year in the driving seat of the Lexus RC F GT500. Sarah Fournier speaks to the Englishman about training and the importance of collaboration.



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**THE ROAD
BOY RACER**



**"IF IT WAS UP TO RASHID,
HE WOULD RACE EVERY DAY"**

Rashid Al Dhaheri is one of the fastest go-kart drivers racing today. He is also just seven years old. BEYOND editor Alex Moshakis followed the boy from his Abu Dhabi home circuit to Jesolo, in northeastern Italy, where he competed on a track previously driven by Ayrton Senna, Alain Prost, Michael Schumacher, and Lewis Hamilton. Might this be a future Formula One world champion?

THE INTELLIGENCE

Smart luggage, new Nordic food, next-generation sneakers, and more feature in our roundup of global trends in craft, design, food, style, and technology



THE TREND

WARM TONES

Long gone are the days when copper and brass were used uniquely to produce tools and weapons. Now bestowing a soft aesthetic and earthy texture to everything from traditional tea caddies and rustic stationery to designer lighting and sleek candlesticks, warm metal finishes have replaced the high shine of chrome and stainless steel. Welcome to a new age of the richer tones of brass, copper, and gold. — *Annick Weber*

Candlestick: Georg Jensen
 Coffee set: OeO Design, manufactured by Kaikado
 Table lamp: Michael Anastassiades for Flos
 Bowl: Tom Dixon
 Paperweights: Oji Masanori



Photography by Matthieu Lavanchy

THE DESTINATION

A MILANESE MOMENT



An exciting group of recently opened cultural destinations have made Milan, a city with established art and design credentials, the place to visit this year and next



→ The Fondazione Prada

Designed by Rem Koolhaas, a cleverly renovated cultural center that features a gold leaf-covered tower.



→ Peep-Hole

One of a number of upcoming contemporary galleries, Peep-Hole is both gallery and lecture destination.

Illustrations by Giulio Miglietta

Milan, long associated with art and design, has this year amped up its cultural offering. Known primarily for the Salone del Mobile, the lauded annual design and furniture fair (at which Lexus, through both the Lexus Design Event and Lexus Design Awards, was present), the city has also spent much of 2015 hosting this year's world fair, a six-month festival that until October will explore new ideas in the areas of sustainability, health, and nutrition. New destinations have sprung up accordingly. In May the Internet went agog at the announcement that celebrated director Wes Anderson had created an impeccable 1950s-inspired bar and café (above) in the Fondazione Prada, a Rem Koolhaas-designed cultural space that houses expertly curated and notably stylish contemporary art in a decadent, modern environment. (True to Prada's philosophy, this transformed distillery, also opened in May, is full of curious, amusing details. One of the building's towers is covered entirely in gold leaf and is referred to as "The Haunted House.") Elsewhere in the city, nonprofit art center Peep-Hole is putting on fantastic shows and inviting the public to learn more about the contemporary art scene via lectures, workshops, and publications. And M Collective, an immersive concept boutique that opened in June, was built to communicate the true value of its products for sale. The impressive space, in the northeastern section of the city, is filled with clothing from up-and-coming labels, new gadgets, and well-chosen works by artists and designers, all arranged in store not by price or brand but state of mind. Now is the time to identify exactly what that means. — *Liv Siddall*

APPS

DRIVING TECH

Ten years ago, who would have believed that in the year 2015 there would be services at your fingertips that could tell you where to get the cheapest gasoline, what route is the most scenic, and when your parking meter is about to run out? Nowadays the app market is saturated with products that do just that. Here are three of the best. — *Liv Siddall*



greenMeter

Well-designed greenMeter provides detailed, real-time feedback on your fuel usage, allowing you to reduce fuel consumption and encouraging environmental awareness.

\$5.99



Roadside America

This app is designed to inspire road trippers to explore the more than 10,000 lesser-known attractions and curiosities that populate roads in the United States and Canada.

\$5.99



HONK

This handy app marks your exact parking location on a map and emits a honk to alert you when your parking time is about to expire.

\$0.99

FAD (AND FAST) FOOD



Illustration by Pete Gamlen

FAVORITE FADS

Editor-at-large Alicia Kirby investigates – and explains – our love of a good food trend



Artisanal toast!



Ramen!



Korean kimchi!

Once a humble source of human fuel, food has become an overfetedized commodity that unites the world's Instagramming hipster brigade in its desire to categorize every dish into a wider trend. Ubiquitous buzzwords – “artisanal!” “organic!” – are now applied to pedestrian foodstuffs (think artisanal toast, the derided spawn of San Francisco’s craft food movement, or organic birch water, the current Cronut of the soft-drink world). But although fads are regularly maligned, food trends can be valuable indicators of the evolution of our society. Our food choices reflect our social, economic, and moral values. They define who we are and aspire to be.

Take society’s current obsession with ramen noodles, an affordable dish with gourmet credibility. The meteoric rise in the global popularity of its springy noodles and rich umami broth boils down to the world’s desire to tap into Japan’s version of soul food. Eating ramen is a humbling and honest act of comfort. Diners appreciate the work required to make the dish. A tonkotsu broth can take a chef more than nine hours to prepare, and years to perfect.

The food trends that have longevity are the

ones that embody a singular focus, impalpable passion, and superior craft. In an increasingly superficial world, diners are looking for authentic experiences. They’re also looking for simple, nostalgic comfort foods – fried chicken, hamburgers – served in casual environments popular for their democratic sense of community.

Food media is a 21st-century phenomenon. It supercharges trend turnaround, captures current social fads, and informs those of the future. Take the health-oriented food and drink sector – its in-vogue nut milks and cold-pressed juices that promise a cleaner, leaner, healthier you as society becomes increasingly interested in a better quality of life. Or fermented vegetables, in particular the punchy Korean kimchi, which tap into an obsession with probiotics for the promotion of good gut health for a stronger immune system.

Industry purists may roll their eyes at the idea of food trends as hollow marketing exercises. But the movement toward a position that allows consumers to make ethical food choices that can improve their quality of life is positive – a genuine sign of economic and social progress.

— Alicia Kirby

HIROSHI SUGIMOTO DOES IT HIMSELF

Hiroshi Sugimoto, a Japanese photographer and the founder of the Odawara Art Foundation, has in recent years been so openly horrified at the state of galleries and their interiors that he has teamed up with Tomoyuki Sakakida Architect and Associates to build his own.



A view of the observatory, which features a cantilevered deck that looks out at the Pacific Ocean.

Sugimoto is making sure that this new arts and culture facility, named the Enoura Observatory, and slated for completion in 2017 in Odawara, on the outskirts of Tokyo, will provide every piece on display – painting, photography – ample room to breathe. (He openly scorns works being hung anywhere near escalators or on busy walls.) The space will marry traditional Japanese culture with breathtaking modern architecture. “In today’s grim world of rampant materialism and consumerism,” Sugimoto says, “it’s the revival of these ancient Japanese traditions that we need most.”

The center will also boast a traditional thatch-roofed theater, a classical tearoom, and a strolling garden, and the back of the building will feature a viewing platform overlooking Sagami Bay, a scene Sugimoto is famous for capturing in countless long-exposure photographs. “I owe a lot to Odawara,” Sugimoto says of the coastal Japanese city. “My earliest childhood memory is of the sea seen from the window of the train to Odawara – the vast Pacific, extending away to a sharp horizon line that snapped my eyes wide open. In that moment, I awoke to the fact that I was me, and that I was here on this earth.” — Liv Siddall

INTERSECT IN DUBAI



In November, Dubai will be the first city outside Tokyo to host an INTERSECT BY LEXUS outpost (a site in New York will follow shortly afterwards). Located in the Dubai International Financial Centre, the manufacturer’s latest boutique gallery and retail concept space will feature a lounge, café, and retail corner, where Lexus-commissioned items are displayed for purchase. Wonderwall, the Japanese interior design firm that has been tasked with designing all three INTERSECT spaces, has created another concept that references the unique features of Lexus models, immersing visitors in the brand’s philosophy, aesthetic, and outlook. — Annick Weber



INTERSECT BY LEXUS
Unit SR-01, Level POD
Gate Village Building 7
Dubai International Financial Centre,
Dubai, U.A.E.
lexus-int.com/intersect

When in Town



Zuma
Ranking on San Pellegrino’s renowned list of the world’s best restaurants, this chic destination in the financial district serves sushi and other Japanese staples.
Gate Village 6, Podium Level, Sheikh Zayed Road, Dubai, U.A.E.
zumarestaurant.com



Boutique 1
With three outlets across the city, Boutique 1 is among Dubai’s leading fashion destinations for luxury and avant-garde collections.
The Walk at Jumeirah Beach Residence, Dubai, U.A.E.
boutique1.com



XVA Art Hotel
This 10-bedroom boutique hotel in a charming heritage building offers guests shady courtyards (to escape that sun) and an art gallery in the heart of a historical neighborhood.
Al Fahidi Neighborhood, Bur Dubai, Dubai, U.A.E.
xvahotel.com

THE RECIPE

RAISING THE BAR

A celebrated Basque chef has spent the past decade bringing high-quality tapas to hungry London diners. Here, Nieves Barragán Mohacho introduces one of her favorite dishes



This escabeche was made in eight minutes at Barrafina's Adelaide Street location, in Covent Garden, central London.

QUAIL ESCABECHE

Serves four as a tapa or two as a main.

FOR THE QUAIL

4 quail, spatchcocked | Maldon salt | freshly ground black pepper.

FOR THE ESCABECHE

400 ml olive oil | 200 ml moscatel vinegar
A large handful of each, or a selection, of the following fresh herbs: sage, tarragon, mint, thyme, parsley, rosemary, and coriander | 6 bay leaves, fresh if possible
20 g pine nuts | 100 g sultanas | 100 g dried apricots
100 g stoned dried prunes.

1. Put all the ingredients for the escabeche into a large pan. Warm very gently for 10 minutes, then set aside. (If the heat rises too much, all the delicate aromatics will be destroyed.) Pour the warm escabeche into a bowl.
2. Heat a griddle pan until very hot. Grill the quail for about 3–4 minutes, skin side down, then turn and cook the other side for 1.5–2 minutes, or until done. Put the hot quail straight into the escabeche and leave to infuse for 20–30 minutes in a warmish place, turning them half-way through.
3. Remove the quail from the escabeche and place on serving plates, spooning some of the fruits and herbs on top of each bird. Season well with salt and pepper and serve.

Barrafina is a name celebrated among Europe's tapas bars. The dishes created at the three London branches – the original, in Soho, and its two siblings, both in Covent Garden – are on a par with Spain's best. Basque chef Nieves Barragán Mohacho has long headed up the kitchen in the Soho branch that launched in 2007, but she now spends most of her time at the newer Adelaide Street outpost, which opened its doors in Covent Garden in 2014. It's here that you'll find her signature plate: quail escabeche, a tangy dish of meat (or more commonly, fish) cooked, then marinated in a sharp, acidic dressing. Mohacho describes it as “a sort of Spanish chutney, or confit with vinegar”; the recipe is a riff on a meal her mother cooked when Nieves was growing up in Bilbao. “My mum used to make tuna escabeche,” she says, “so this dish has a place in my heart.” She has made the recipe her own, using quail, as some do in the Basque region, and with grape vinegar, herbs, dried fruit, and pine nuts in the dressing. “For me, it's all about the ingredients,” she says. “I never want to have more than three ingredients in a dish, but obviously it has to be the right combination! In Spain you have some of the best raw ingredients in the world, so why mess with them?” A big advantage of eating at the Adelaide Street branch is that it's a bit less busy than the better-known Soho original, which now has a Michelin star. Neither restaurant takes advance table bookings, so at peak times there can be a long wait. It's worth it. Mohacho is a hands-on chef. Working from an open kitchen, she often talks to diners, asking them what they think of the food. “You won't find many places in London with escabeche on the menu,” she says, “but as soon as you try it you'll be surprised by how delicious it is.”

— Guy Diamond

TECH

NEXT-GEN SNEAKERS

There are your average sports shoes – the models we wear during an early morning jog, say, or to play tennis in the park when the weather is nice. And then there are the next-level sneakers that can make you run faster, jump higher, reach further. Here are three technologically progressive sports shoes – one with shock absorbers! – that make all others look slow, cumbersome and more than a little run of the mill.

— Alex Moshakis



The Windchill

In 2010 the NBA banned a basketball shoe produced by Athletic Propulsion Labs, an American start-up, because the sneaker's built-in spring system provided players with an unfair advantage. Last summer APL launched its first running shoe, the Windchill, which features a six-spring patented technology designed to add propulsion as athletes toe-off midrun.



The EL-X

More gloves for your feet than a standard sports shoe, the EL-X, manufactured by Italian sportswear company Vibram FiveFingers, is lightweight, breathable, and durable, and offers users a sensation much like running barefoot.



The Enko

Designed in Toulouse, France, Enko is "a new type of running shoe" that offers a "sensation like never before," the manufacturers claim. A sneaker that translates absorbed shock into extra forward momentum, it features different setups for ultimate comfort while you walk, jog, or sprint.

THE BITE

NEW NORDIC FOOD



Picturesque Tórshavn, capital city of the Faroe Islands.

Thanks to trailblazers like René Redzepi, the popularity of Nordic cuisine has rocketed in the past decade. New York held its first Nordic Food Festival in 2013, and supermarkets around the world have been stacking their shelves with traditional Nordic treats in response to growing demand. The cuisine's incomparably fresh ingredients are naturally low in fat, and the curious methods in which culinary pioneers have been arranging them on plates (and occasionally rocks) have influenced restaurants worldwide.

Despite Norway and Sweden leading the movement, recent whispers among foodies suggest a new culinary star in the region: the Faroe Islands. The knot of Danish islands has attracted a string of famous chefs to sample some of the curious cuisine on offer, and the restaurant at which they all want a reservation is KOKS.

Built by local chef Leif Sørensen in Tórshavn, the islands' capital city, KOKS embraces the thrilling surrounding landscape and culinary history of the Faroes. "You can have stunning meals all over the world," says Karin Visth, the restaurant's sommelier. "But it is increasingly difficult, because of globalization, to have a unique experience."

KOKS serves fresh, seasonal food harvested directly from local land and prepared using a combination of ancient and modern Faroese techniques: drying, fermenting, pickling, curing, and smoking. "Instead of the new, it emphasizes the old," Visth says of KOKS' approach. "Our cuisine is about seasonality and making age-old food delightful to modern palates."

On KOKS' current menu, Visth's personal recommendation is ræst, a dish produced using a local preservation technique. "We also have the best langoustines," she says. "And sea urchins and Faroese cod. Their meat is an unforgettable experience."

— Liv Siddall

Meaty Faroese langoustines.



Staff pick wild berries near the restaurant in Tórshavn.

Illustrations by Giulio Miglietta

Photography by Robert Wyatt. Illustration by Giacomo Bagnara

LEXUS

GOODWOOD'S ENDURING APPEAL



Visitors watch a race at Goodwood's 2015 event.

The sheer scale and variety of classic and contemporary vehicles on view at the annual Goodwood Festival of Speed – crucially moving as well as static, unlike at conventional motor shows – make for a car event like no other.

Imagine a lovely English stately home set within massive grounds, whose owner, Lord March, likes nothing better than to convert one of the roads that run through his estate into a temporary racetrack for a long weekend in late June every year. With stands each side from which to view the proceedings up close, and access to the pit garages before and after – something Formula One race fans can only dream of – he then invites the world's finest drivers to take turns roaring up Goodwood's famous hill in F1, Le Mans, and rally cars, as well as on classic motorbikes and in newly released production supercars. This is fun but undoubtedly noisy. For those who prefer subtly surfaced bodywork to carefully calibrated engine notes, the Style et Luxe concours d'élégance is the place to spend

time, where an always wonderfully curated collection of exotic concepts and one-off coach-built cars is exhibited on the civilized lawns outside the main estate buildings.

With its unique setting, unrivaled access, and relaxed approach, the Goodwood Festival of Speed, which has been expanding in size and scope since its 1993 launch, is now a firm fixture on the global motoring calendar; attendance is fast approaching 200,000 over the four-day extravaganza. Other motor shows may have some of these elements, but none include them all and combine them as effectively as Goodwood. Its organizers' claim of being the "biggest motoring garden party in the world" is no idle boast.

— Guy Bird



The Lexus GS F



The Lexus RC F GT3



The boundary-pushing Lexus LFA

Q&A

THE RISE OF SUSTAINABLE HOTELS



Barry Sternlicht
Hotelier

Traveling is no longer just about visiting new places – it has become a way of connecting with the environment. A boom in eco-friendly hotels is offering a more natural experience of being away from home. Barry Sternlicht, founder of the sustainable 1 Hotels in Miami and New York, reveals why the future of hotels is green.

Q What inspired you to launch an environmentally conscious hotel group?

A Many of us are already living our everyday with the planet in mind, so I asked myself: Why not extend this trend to the way we arrive, sleep, and relax when traveling? We worked with sustainable architects to develop a high-design, low-impact hospitality concept that focuses on simple changes that make life better – one bed, one plant, and one less plastic bottle at a time.

Q How do you combine sustainability and sophistication?

A True sophistication lies in the simple beauty of nature, the use of raw materials in architecture, and organic products inside the hotel. We want guests to rethink their needs, showing them that they don't need to look further than their immediate surroundings for inspiration, be it through locally sourced food or by partaking in one of our stargazing sessions held at each property. We call it the luxury of enough. — Annick Weber

IN NUMBERS

BOOM TIME

As interest in film grows around China, the number of cinema screens in the country is booming.



100



Number of screens built annually in the U.S.



Number of screens built per week in China

THE EDIT

IN THE BAG

Lost luggage and other travel-related nuisances may soon be things of the past thanks to a new line-up of connected suitcases that promise to offer peace of mind – from check-in to baggage reclaim

Remote lock



Silicon Valley-based technology start-up Bluesmart launched the self-proclaimed "world's first smart luggage" in late 2014. Among innovative functions of their eponymous carry-on was a Bluetooth-enabled remote lock, now found in most connected suitcases. The system lets users lock and unlock their bag remotely via a companion app and secures it automatically when separated from the owner and his phone.

USB battery charger



Mobile devices are key to the functioning of the new generation of smart suitcases – users can operate and enable the features of their bag with their smartphone or tablet. Manufacturers – from emerging travel solutions provider 24-7 to established Samsonite – have built in a remedy for the shorter mobile battery life that all this connectivity may risk: an integrated USB charger, which recharges portable devices hassle-free.

Wifi



As the moniker says it, connected bags allow the user to always be connected – without the roaming fees or the need to share public Wifi networks. The Andiamo IQ by 24-7, for instance, gives its owner instant internet access via the Wifi hotspot it creates. Like other mobile devices, all high-tech luggage is designed to automatically switch to flight-mode once in the air.

Anti-theft alert



Even if a bag is in the proximity of his owner on a train, bus or on the way to and from the airport, it doesn't always mean that it is safe. Samsonite's GeoTrakR – due to hit the US market this fall – is equipped with an anti-theft alert that tracks how close a user is to his belongings. The function sends a message if the suitcase moves over 30 meters away from its owner.

Digital scale



Rimowa and plane manufacturer Airbus recently collaborated to devise a suitcase that can be checked in online. All travel information, such as baggage weight (there is an in-built scale) and destination airport, are recorded on a barcode, displayed on the bag's in-built screen. Airports will be equipped with special luggage drop-off machines that recognize this barcode, saving passengers time and avoiding excess weight charges.

GPS tracker



One of the main assets of high-tech luggage is the in-built tracking function, which lets the user follow the course of his checked bag on his smartphone. Free-standing trackers, such as LugLoc or Trakdot, are a viable option for those not wishing to replace their 'analogue' suitcase. These cellular-enabled luggage locators are placed inside any bag for worry-free travel.



Text by Annick Weber and illustration by Janne Linnonen

THE SOUND OF ICELAND



The interior of Harpa, which gives visitors the sensation of being inside a futuristic iceberg.

For a country with such a small population – just over 300,000 – the recent production of world-renowned experimental musicians in Iceland is impressive. Household names – Björk, the postrock band Sigur Rós – have attracted international followers. Now, members of a burgeoning collaborative classical music scene are following suit. They have in part an enormous shimmering glass structure to thank.

Construction of Harpa, a vast concert hall that overlooks Reykjavik's picturesque harbor, began in 2007 and continued for the next four years despite a grim national recession. Designed by Henning Larsen Architects with the help of celebrated Icelandic artist Olafur Eliasson, it opened in 2011 to showcase Iceland's great creative exports. And it has been successful. A breathtaking, hive-like structure, it is the country's largest concert hall and houses a variety of cultural events: gigs, fashion shows, exhibitions. "In the short term, Harpa might not have encouraged people to start to learn music," says Greipur Gíslason, a project manager at the Iceland Symphony Orchestra, "but it has made classical and contemporary music much more accessible, even mainstream. Since the Iceland Symphony Orchestra, the only one in Iceland, moved to Harpa, its ticket sales have increased by 100 percent."

Contemporary Icelandic classical music is very much on the rise. In early 2015 composer Jóhann Jóhannsson (whose work has been shown at Harpa) was nominated for an Oscar for his score to *The Theory of Everything*, the Stephen Hawking biopic. And young composer and conductor Daníel Bjarnason, who has collaborated with Sigur Rós and the Danish rock group Efterklang, is currently writing an opera for the Danish National Opera that will be completed in 2017. Bjarnason is part of Bedroom Community, a young Icelandic record label that promotes a handful of the country's most exciting and diverse artists to hungry music fans all over the world. And centered in Reykjavík, S.L.Á.T.U.R., an "artistically obtrusive composer collective," uses animation, design, film, and computer graphics alongside its music to open it up to new audiences. S.L.Á.T.U.R. sums up the current bubbling musical scene in Iceland with one ambitious statement: its mission, much like that of other musicians in Iceland, is to "gradually develop an entirely new culture." It looks like the collective, and their friends, might just manage it. — *Liv Siddall*

RUSSIAN FASHION'S FORWARD MARCH



Alice and Julia Ruban
Fashion Designers

In five years, sisters Alice and Julia Ruban have gone from assisting at couture houses in their native Russia to developing their own luxury women's wear brand. RUBAN isn't just a personal success story, though – it is also a tale of goings-on at the Russian fashion front: young designers are reenergizing a once-stagnant scene.

- Q** What is the current state of Russian fashion design?
- A** In the last few years, many designers in Moscow have stopped focusing on typical "Russia" motives and started creating unique collections. Just like us, they are crafting pieces that are true to their own aesthetic, rather than that of our country. We believe that this will lead to an increasing presence of Russian labels on a global scene, especially in the U.S., Europe, and Asia.
- Q** How do consumers respond to this trend?
- A** Russian fashion consumption used to be focused on international haute couture, but now, with the rise of many exciting new designers, it is looking more toward our own scene. There are two reasons: firstly, the global financial crisis, which increased the price of imported goods; and secondly, the bigger choice of home labels that can compete with international brands. — *Annick Weber*



A look from RUBAN's autumn/winter 2015 collection.



Illustration by Martina Paikova

TAKING A BREATHER

When a pair of Canadian friends grew frustrated with the lack of decent meeting space in Montreal, they decided to make their own

In 2012 old friends Julien Smith and Caterina Rizzi began lamenting the lack of office space available for a decent meeting in their home city, Montreal. The pair were in regular need of a room away from the hiss of milk frothers and the honks of traffic, but nothing like it existed. "After countless business trips, early checkouts, distracting coworkers, and noisy coffee shops put a dent in our productivity, we knew there had to be a better way," the pair say. "But there wasn't."

Smith and Rizzi began to imagine a room you could rent for small chunks of time and that would provide on-the-go professionals with adequate space and utilities to conduct a meeting, charge a phone, or simply take a break. And then they came up with Breather, which provides a burgeoning freelance population in U.S. and Canadian cities with an array of well-designed spaces – large meeting tables, comfortable couches, designer lamps – for exactly those kinds of activities.

The service is a quick-fire alternative to Airbnb – it offers a minimum rental time set at 30 minutes and the freedom to book the entire day. But unlike Airbnb, which offers around one million properties to rent worldwide, Breather is growing slowly. As yet, just a handful of spaces have popped up in Montreal, San Francisco, Boston, Ottawa, and New York. But the company has plans for expansion.

Secrecy is important; the team at Breather doesn't necessarily need to know what goes on in the room you hire. But they do know that as well as booking the spaces for meetings, weary tourists and workers have been using them for naps, and that some spaces have even been booked for yoga and meditation classes.

Using the service is simple and can be done entirely through a smartphone: reserve a space via an app, unlock the door using a unique PIN code. The initial deposit for using the service is \$250, but most spaces cost between \$15 and \$40 per hour. Once you're in, a selection of stationery and refreshments is available, as is anything else that you might need: projectors, plug sockets, and – most important – phone chargers. — *Liv Siddall*

The new Lexus NX is bold, distinctive, and dynamic. It also features one of the most progressive and impressive seats the brand has ever developed. Chief engineer Takeaki Kato tells us more

SUPPORT ACT

When he was developing the new Lexus NX, passenger comfort was high on the list of priorities for chief engineer Takeaki Kato, and among the most crucial elements to consider were the front seats. It's said that race-car drivers, a sensitive sort, know how their cars are performing by the way their seats act. If the car understeers, for example, they feel it – the yaw – in the movements. Kato wanted the same level of car-to-driver communication in the NX. But although he wanted something stylish and sporty, he knew he couldn't compromise on comfort. The seats had to look good. But they also had to be appropriate for use on multihour commutes.

The balance, Kato says, lay in the firmness of the seat cushions: "Finding the right amount of firmness took a lot of effort. We didn't want the seat to be too stiff, because the driver would experience fatigue on long trips. But if we made it too soft, the driver would be moving around a lot – bad during turns. Our answer was for the seat to be firm but the surface soft."

The end result is a seat that provides both balance and physical support. NX drivers will experience the sensation of sitting in the seat, rather than on top of it. And along with ide-

ally shaped bolsters, which deliver degrees of lateral support, drivers can fling the NX around corners without being tossed around themselves. The front seats in the NX F Sport, which use form-fitting integrated foaming, allow the cushions to mold to the backs and thighs of its occupants, offering extra support. And a unique upholstery process that involves an intricate stitching pattern to increase strength (as well as perforation that lets the seat's leather breathe), provides an extra dose of luxury. The color combination of black and dark rose, exclusive to the F Sport, exudes a solemn aura that gives the interior a high level of distinction and class.

"I think the only people that might notice that would be professional upholsterers," Kato says, "but adding these subtle extra touches makes it all worthwhile. My philosophy was to take as many steps as necessary to ensure the highest quality of vehicle, whether those steps are immediately noticeable or not." ☉

Text by Sam Mitani and photography by Mikio Hasui

THE STITCH

The front seats of the NX F Sport, shown here, feature a unique upholstery process that provides the model with an extra measure of luxury. Look closely at the stitching on the lower seat backs and you'll notice that it forms an intricate interwoven cup-shaped pattern. Look even more closely and you'll see that there are gaps in the perforation that follow the complex shape of the stitching. This prevents the stitching needle from passing through the holes in the perforation, which would otherwise decrease material strength. According to Kato, Lexus is the only manufacturer to employ this special technique.

THE ICON

HANGING GARDEN

How the scientist behind a little cardboard tree proved that there is no use crying over spilled milk

In late 1951, a milk truck driver passing through Watertown, a small town in northern New York State, started chatting to a local about the nuisance of the odor of spilled milk inside his truck. As luck would have it, he was talking to the right man – the local was Julius Sämann, a Swiss-born biochemist who had spent much of his career studying methods to extract, transport, and disseminate aromatic oils from pine needles in Canada's alpine forests. Sämann began to apply his research to a solution for his new acquaintance's problem – and then he designed one of the most recognizable objects in the world.

Sämann released his product to market in 1952. An automotive air freshener made of porous, scent-impregnated cardboard, it was cut into the shape of a pine tree and designed to be hung on a car's rearview mirror, filling the vehicle with a fragrance intended to oust others less welcome. Sämann's Little Trees were cheap and accessible, wrapped in a cellophane pouch that was rolled back gradually, week after week, to release the air freshener's pine fragrance in stages. As the cardboard's oily, aromatic substances weakened with time, drivers would expose a larger surface area until the tree was completely revealed, free from its cellophane coat, emitting the last of its scent.

Little Trees were soon dangling from the rearview mirrors of far more vehicles than that milk truck. The 1950s was a decade of American consumerism. Car sales were booming, the vehicles bought en masse by an increasingly suburban population looking for a convenient (and more and more affordable) way to get around. In *Mad Men*-esque fashion, drivers regularly smoked behind the wheel, upping demand for a long-lasting air freshener available at a low price. Sämann's Little Trees proved to be such an efficient solution to a common prob-

lem that orders started rolling in from all over the country. The scientist upped production from his Watertown factory (to this day the company remains family-run in the town), and then he took his trees global.

More than 60 years on, the library of Little Trees fragrances has grown from the original Royal Pine scent to some 60 variations, with aromas that include the ever-popular Vanillaroma, the sweet and juicy Bubble Gum, and the purist New Car Scent tickling the noses of millions of drivers, truckers, and taxi passengers every day. The instantly recognizable evergreen shape has won the brand an iconic presence in popular culture, having brought a touch of realism to

numerous scenes in sitcoms and movies from around the world. Adding to the cult status of Little Trees is the production process, which has been a well-kept secret ever since Sämann's day.

Many look-alike items have appeared and disappeared on the market, but the Little Trees are still hyped as the real thing. Their components and manufacturing have changed surprisingly little over time, remaining true to one passionate biochemist's mission of providing drivers the best fragrance experience for as long as there are rearview mirrors from which to dangle objects. ☺

Text by Annick Weber
Photography by Matthieu Lavanchy



IN SCENTS

There are now 60 fragrances in the Little Trees scent library, from Bayside Breeze to Summer Cotton, Black Ice, New Car Scent (shown above), and Vanillaroma are three of the most popular.

IN CULTURE

Little Trees have made more than 1,500 movie and television appearances. You might have seen them in David Fincher's *Seven* (1995), or Terry Gilliam's *The Fisher King* (1991).

IN NUMBERS

Little Trees is now 63 years old. It costs \$7.50 for a pack of six, and each unit weighs 286 grams. The company doesn't disclose how many items it's sold, but the figure totals in the billions.

IN PACKAGING

Each Little Tree is wrapped in a special film pouch that retains its fragrance until opened and ensures that none of the aroma diminishes while the item awaits purchase in store.

Trollstigen, a hair-raising section of Norwegian National Road 63, is both a vital local thoroughfare and a popular tourist getaway. Photographer David Ryle traveled to western Norway to capture the pass' iconic bends

THE BENDS

Photography by David Ryle



HAIRPINS

Trollstigen, which opened in 1936, winds through Norway's Romsdal County, linking grand Lake Langvatnet to the Rauma River-crossing Sogge Bridge, 106 kilometers away. With a nine percent incline, the pass' steepest stretch is called Ørnevegen ("Eagle Road"). It consists of 11 hairpin bends, eight of which are shown here.

UP TOP

Ørnevegen is surrounded by mountains - Kongen (the King), Dronningen (the Queen), and Bispen (the Bishop) - that offer experienced trekkers a variety of summit hikes and BASE jumpers a number of natural points from which to launch. That latter sport originated in the area - in 1980 Jorma Oster, a Finn, made the world's first parachute jump from the Troll Wall, a notorious leap site nearby - although the pastime has been deemed illegal since 1986.

TROLL TRAILS

Scandinavian folklore is rich with mythical creatures. Dwarves are common; so are elves. But of all of Norway's storied beasts, trolls are the most common. Comically large, hairy, and slow to act, the beasts (which are said to live under bridges) give their name to this section of road (Trollstigen translates as "the troll trail") as well as various peaks in the area.

SNOW GO

Trollstigen is closed during late autumn and winter, when heavy snowfall makes the road pretty much impossible to pass. When it reopens, usually in May, the route is used by around 2,500 drivers daily.

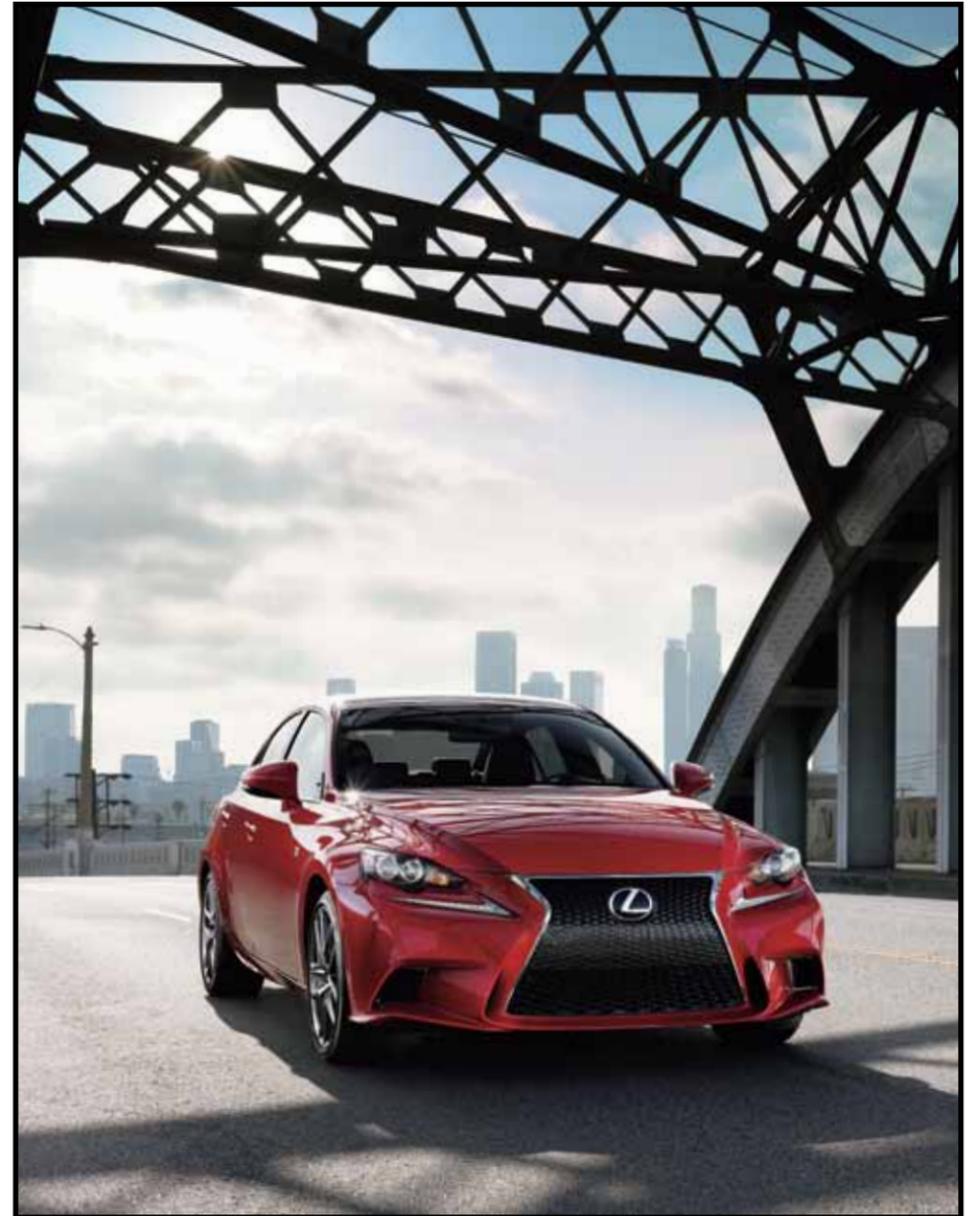
THE CAR

When the next-generation IS was launched in 2014, it established a new standard of driving performance for sports sedans. The IS 300h, shown here approaching one of Ørnevegen's hairpins, is the first Lexus hybrid to feature a battery positioned beneath the luggage deck board, contributing to a sportier driving experience by creating a lower center of gravity and greater rear body rigidity. Additional benefits include luggage capacity on a par with gas-engine models, fuel consumption of less than 4.3 l/km, and class-leading CO₂ emissions below 100 g/km.

THE UPDATE

MAKING

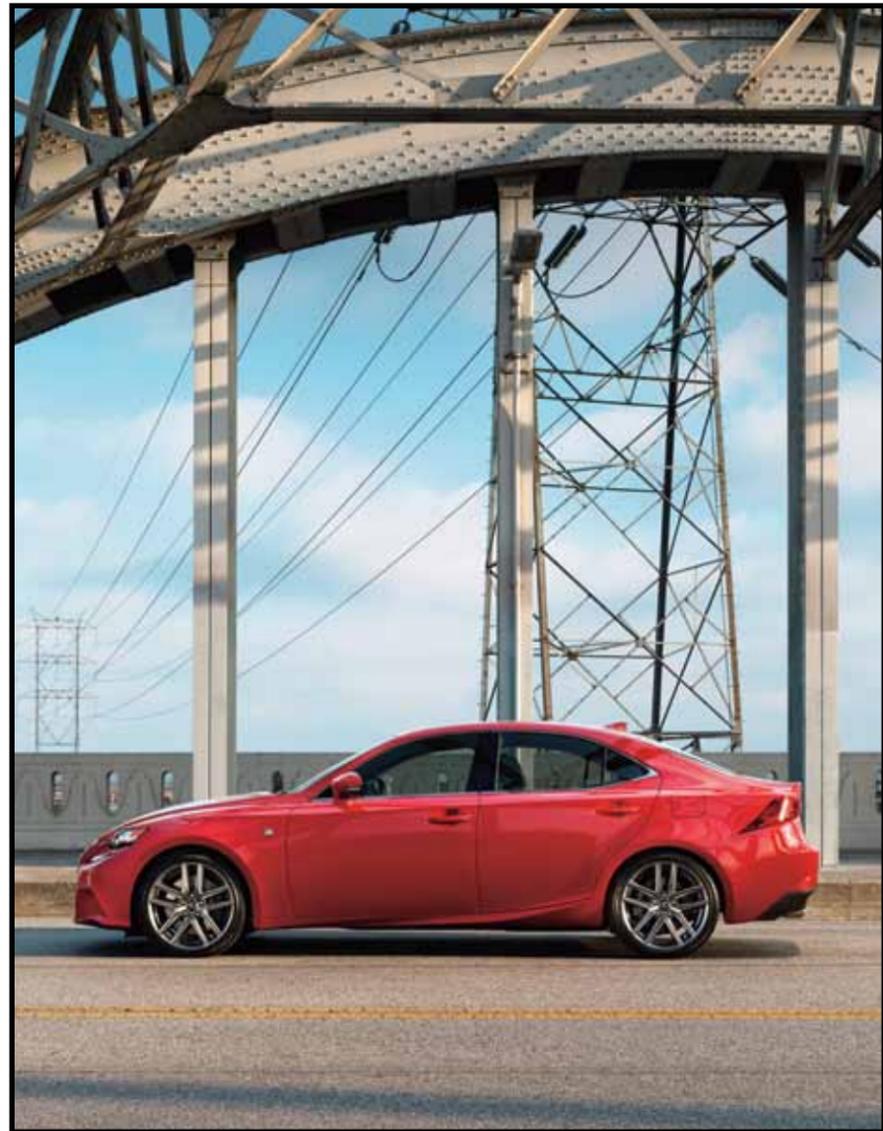
The Lexus IS was the brand's most popular sedan. Then along came its more powerful and dynamic update. We take the new Lexus IS 200t to LA's iconic Sixth Street Bridge



TURBO

Text by Sam Mitani and photography by Greg White





The IS is Lexus' most popular sedan, praised by the public and the media alike for its blend of head-turning good looks, sporty performance, and luxurious character. But that formula is about to get even better, with the addition of an all-new model: the IS 200t.

What makes the IS 200t notable is what lurks underneath its hood: a 2.0-liter turbocharged gas engine that delivers 241 hp at 5,800 rpm. The engine, developed in-house by Lexus, was first incorporated into the popular Lexus NX, but in the new

IS, a freer-flowing exhaust has helped enhance engine output. Delivering power to the car's rear wheels (the IS 200t is only available in rear-wheel drive) is a smooth-shifting, eight-speed transmission, with steering wheel-mounted paddle shifters that help the car sprint to 100 kph in 6.9 seconds. But while the IS 200t exhibits a supple ride quality, seats five comfortably, and stays remarkably quiet on the open highway, the winding mountain road is where this car shines. Thanks to perfectly tuned suspension, the four-door sedan

corners like a sports car, exhibiting near-neutral balance.

The model's exterior and interior are visually identical to those of its stablemates – a good thing, judging by the praise that both the IS 300h and IS 350 received. The exterior is aggressive but elegant (Lexus' trademark spindle grille takes center stage), and the interior is appropriately luxurious, highlighted by comfortable sports-style seats and a handsome dashboard. ☺



HUMAN NATURE

INSIDE

THE

It isn't even on a map. It doesn't really have a name. Iron Mountain, the company that owns and operates the catacombs of this former limestone mine, calls the place "The Underground" – quotation marks included, as if to signify that it is as much an idea as a real, physical space. The old mine is by far the storage company's largest and most secure facility – a level four, it's called. Only a handful of government buildings (the Pentagon, the White House) have a security level that's higher, five, which is as high as it gets, security-wise.

Text by Ryan Bradley
 Photography by Christoph Morlinghaus

CORBIS

ARCHIVE

The drive to the mine, through the low rolling hills of western Pennsylvania, on a two-lane country road, is so quiet and pastoral that the appearance of the sprawling, seemingly endless parking lot outside “The Underground” appears monumental. The mine’s entrance, in contrast, is shockingly small: a gash in the earth, just large enough to fit a large car, maybe a truck, surrounded by guard stations and razor wire and dense green forest. After depositing my driver’s license in exchange for a visitor’s badge, I sit in my car while an armed security officer inspects every inch of it (including the glove compartment and trunk). Then I’m waved through and follow an escort vehicle past the gates, driving down, underground, into the maze. All to visit some old photographs.

Deep inside, in a refrigerated vault the size of a football field, rest 27 million images, indexed, filed, and carefully stored. Each one is singular in some way. Many are prints with no negatives. Some are images on glass plates. Others exist only in the pages of magazines long out of print. They are the bulk of the Corbis archive, a collection that is itself an assemblage of several image collections, the crown jewel of which is the Bettmann Archive. To say that many of the 11.5 million images in the Bettmann Archive are iconic is accurate but falls short. Several of these images transcend cultural import and have, through their ubiquity, entered our collective consciousness. One need only describe them in the vaguest detail to immediately conjure them. Einstein sticking out his tongue, for example. Or men on a lunch break from building a Manhattan skyscraper, sitting on a crossbeam suspended far above the skyline. Or Marilyn in a billowing white dress, standing on a subway grate. Corbis, which is owned by Bill Gates, calls the Bettmann “history’s photo album.” It is worth quite a lot of money and also, in a way, invaluable, which is why it’s stored here, in the Iron Mountain, this rather insane place. There are a bunch of other reasons to store precious photographs hundreds of feet under the earth. Gary McPartlin is busy explaining several of them to me.

McPartlin is an Iron Mountain employee and the operations manager at “The Underground.” He leads me through the mine before I visit the Corbis vault, tells me that it’s heat and moisture that ruin film of all kinds, and that the mine has neither. The tremendous vents used to aid airflow keep things even more consistently chilly than the mine might normally be, and they sap the air of all moisture. It’s a controlled environment, sure, but helped considerably by the mine’s dry, dark, and cool natural state.

McPartlin has been “in records,” he says, “his entire professional life,” which in this case began in the Marines, where he worked as a record book



Top: The entrance to the mine, cut into the limestone rock. Middle: The entrance to the Corbis archive, with a screen that displays a cycle of iconic images. Bottom: Fuse boxes on an archive wall.



Right: One of the large interior roads that lead through the mine.



clerk. He has been in “The Underground” for 15 years, hails from Boston, and has the accent to prove it. “Records sounds dull but it really isn’t,” he says. “The idea that this is something you can push away and have high-school kids do is really not the case anymore.” The problem facing nearly every archive, even the ones stored and managed here, is indexing. “Indexes,” McPartlin says, “are everything. That’s how you find what you’re looking for.” The challenge in this digital age is that physical records have a way of disappearing. Particularly if they’re written in pencil, and many are. That information degrades, then disappears with time.

The other problem is formats. Consider the number of film formats that exist today – 35 millimeter, 120, 220, larger format, Polaroid, Polaroid knockoffs, for starters – and then expand that out, backward through time, to

photography’s very beginnings, and you begin to see the scope of the situation. Now, lump in all other forms of captured media: movies, television, audio. Corbis is far from the only keeper of precious cultural artifacts in “The Underground.” Warner Bros. and HBO and CBS and ESPN and Steven Spielberg’s Shoah Foundation (for recording recollections of the Holocaust) all store here, too. As does BMI, the record company, and many others. Most of the doors McPartlin and I pass as he drives me around in a golf cart are unmarked, except for a series of numbers, as most of Iron Mountain’s tenants wish to remain anonymous. The majority of the space in “The Underground” is rented by the federal government, and I see signs for the Social Security Administration and the United States Patent and Trademark Office, as well as many branches of the military. About 1,800 people work inside the mountain every day.



It’s a small city, really, each door leading to a different archive or department. The door McPartlin leads me to next deals directly with the problem of all these formats.

The Iron Mountain Digital Services department started not long after Corbis set up its archive here, 12 years ago (the timing of the move is meaningful: the archive was previously housed in Manhattan, blocks from the World Trade Center). The department takes the photographs, videos, and audio recordings from its tenants and digitizes each one. Sometimes this is as simple as sending something through a scanner. More often the work involves deftly reworking the artifact back through its original intended player – a reel-to-reel or Betamax, say, but usually something far more archaic – so as to capture it digitally. The department, then, is also a working museum of media players. Its walls, like all

the walls in the mine, are rough and rocky and painted, only these walls are silver, not white. When I ask one of the long-haired AV specialists if the silver paint has any significance, he shrugs. “Nah, it’s just to reflect the light,” he says. “But it’s kinda cool,” which – yes, it is.

McPartlin then drives me back to Corbis, but not before taking me past a few locomotive-sized generators and pointing out several large exit signs. (There are multiple exits, many of which are semisecret, to be used in case of emergency.) We also stop by an underground lake, with water so clear I nearly step right into it. We wind and twist and turn, and when I see a map of the whole layout (obscured slightly, for security reasons), I learn that Iron Mountain currently occupies only about a fifth of the entire mine’s footprint, and already the place seems endless. I’m gobsmacked. McPartlin beams and, nodding,

Above and opposite: Rows of stacking shelves and filing cabinets filled with images in a variety of formats.



Above left: Ann Hartman routes through a Corbis file. Above middle and right: Original pieces are displayed on light boxes. Left: Prints of iconic photographs hang on the archive's limestone walls.



SEVERAL OF THESE IMAGES TRANSCEND CULTURAL IMPORT AND HAVE, THROUGH THEIR UBIQUITY, ENTERED OUR COLLECTIVE CONSCIOUSNESS



Above: The original "Lunch atop a Skyscraper."

reminds me that record keeping only sounds dull but, really, isn't.

When we reach the Corbis archive, a small crowd has gathered outside the door. They're staring at a flat-screen television, mounted into the rock to the left of the entrance. The screen runs a slide show of a few dozen of the images out of the millions that the archive holds. They're not Corbis employees – just three people work in the archive full time, plus occasional interns – but along the walk to their subterranean offices they've stopped to enjoy a few glimpses of the treasures behind the door. This isn't uncommon. Ann Hartman tells me. Hartman is the senior manager of library and records management, which means she is more or less in charge of the vault. Before this she was managing records for a utility company in Pittsburgh, Pennsylvania. Oil plants, well logs, that kind of thing. This is different. "I wasn't working underground, for starters," she says.

Much of her day is filled with completing orders that come in from Corbis account executives in New York. Often, a "client" (meaning: customer) sees an image online that has already been scanned, and wants to know if Corbis has anything else like it in the archive, maybe an outtake from the same shoot, or some similar theme or era. Years ago some of the folks working on the Martin Scorsese film *Gangs of New York* approached Corbis looking for illustrations of the Boss Tweed gang fighting around Five Points, a famous intersection in Manhattan. Corbis did have some. Hartman points me to a beautiful magazine called the *Police Gazette*, founded in 1845, which cataloged all manner of crime, including those fights, in brilliant, careful line drawings. The *Police Gazette* is in the Bettmann Archive, of course.

As we walk, shivering a little, through the chilled vault, Hartman opens various drawers



Above: An archive door, featuring a photograph of screen idol Audrey Hepburn. Below: A corridor at the archive. One side is lined by filing cabinets, the other is a limestone wall.

with white-gloved hands, thumbing quickly through the filing system and plucking out an image. The walls here are a luminous, glossy white; the cabinets of index cards and photographs come from all eras – some, the oldest, are wooden, and very beautiful. From the rough walls hang large prints from the collection, angled slightly downward at the viewer, calling to mind the way art in some churches is angled toward the pews. The effect of the cavern is surreal. It's like a cold and holy lair of a supervillain.

We see, or pass by, all the VIPs – royalty, celebrities, presidents, Einstein with his tongue, Marilyn with her skirt – but the most striking images, to me, are those I've never seen, that exist only here, have yet to be digitized, even. Each one contains a whole world, long gone. Hartman shows me an image from 1905 of women dancing to the sounds coming from an early phonograph;

and another, on a glass plate, from 1925, with a hearty-looking woman glancing upward, proudly, at the camera. "The Bugaboo of femininity is the fear of becoming stout," the caption begins.

I begin to see why these millions of images are stashed under a mountain, in a carefully cooled room (with a temperature that is slowly, slowly getting colder over time), in a place seismically sound and secure. What seemed an insane way to store things suddenly feels fitting. I ask Hartman if she has a favorite image in the whole lot. She does, she thinks. It's a very old image of a very young man – a soldier in the Civil War. He's just 13, and the expression on his face, the hard look of a warrior, will break your heart. "Can you even imagine," she says as we look at the young soldier, and I can imagine, if only a little, only because we have this photograph in front of us, to help us remember. ☺

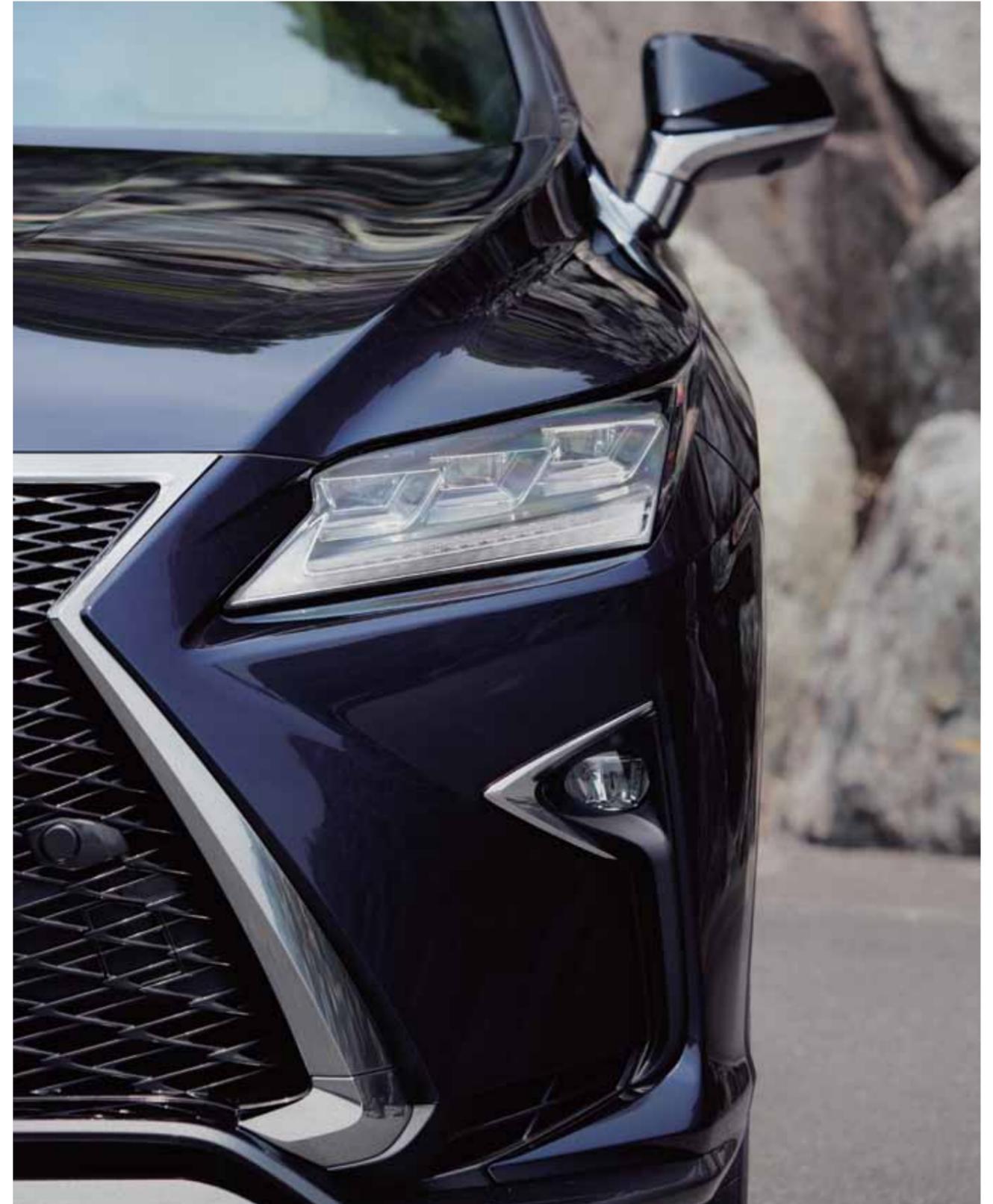


THE REVEAL

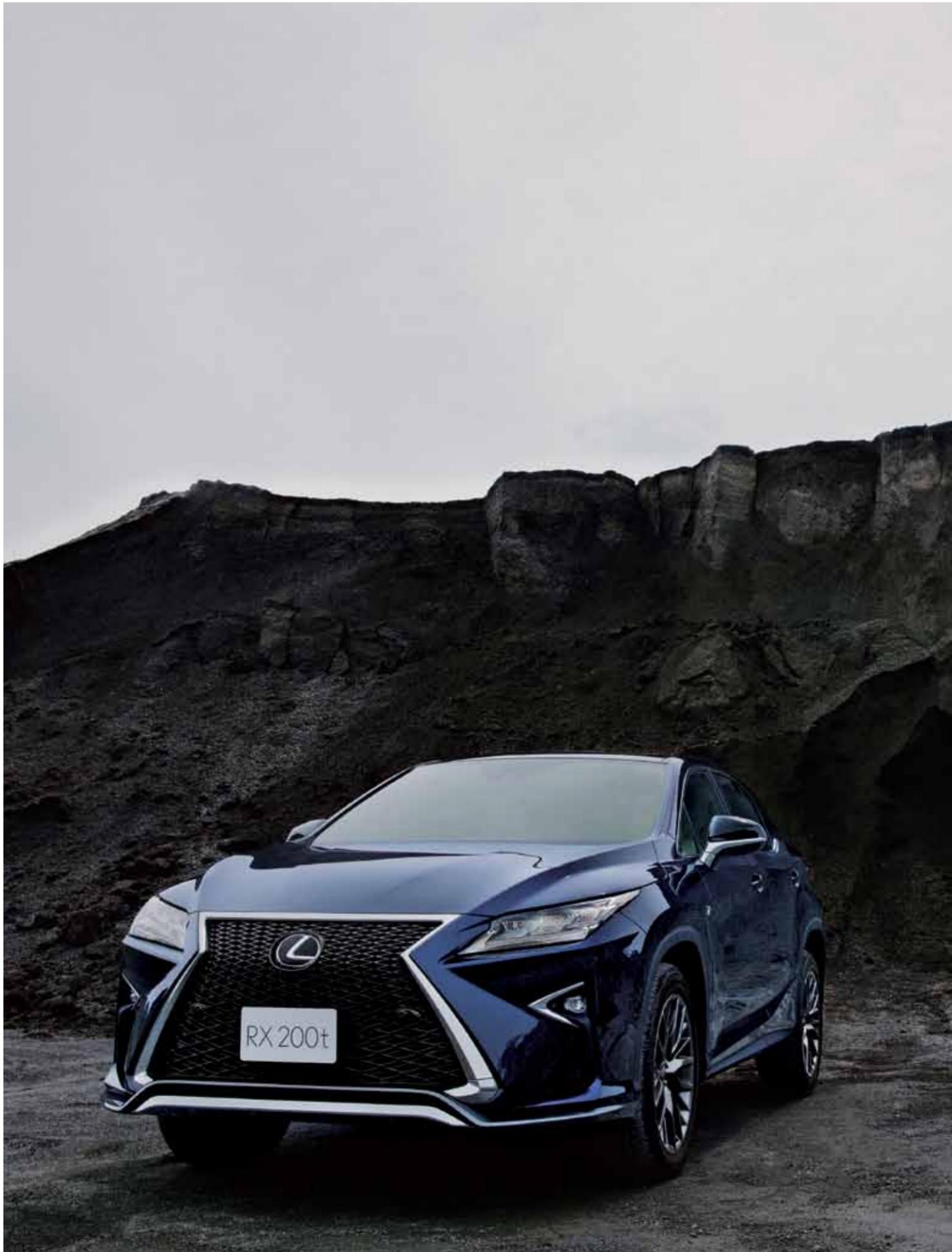
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The all-new Lexus RX is bigger, bolder, and more dynamic than its forebears. We took it to the hulking Takizawa Dam in eastern Japan to put it through its paces

Text by Sam Mitani and photography by Mikio Hasui



The RX's most dramatic angle is the front, where an emboldened version of Lexus' trademark spindle grille commands immediate attention. In fact, the front features a completely new fascia, highlighted by a confident chrome-plated border and triple L-shaped LED headlamps. There are also redesigned fog lamps, and bold front fender flares.



Lexus designers went beyond conventional notions of styling for the new RX, producing a sporty yet elegant look defined by sharp lines and stark color contrasts. The black section on the two-tone C-pillar creates a floating roof appearance, while the sumptuous cabin exudes a strong sense of spaciousness, thanks in part to a new configuration and the texture of the high-quality materials. The center console features the Remote Touch Interface with new side Enter buttons that enhance operation.



Meticulously crafted, the jewel-like taillights of the high-grade RX highlight a totally restyled end. The LED turn signal lights are sequential: meaning they illuminate in order from the inside to the outside, conveying the change in direction of travel.



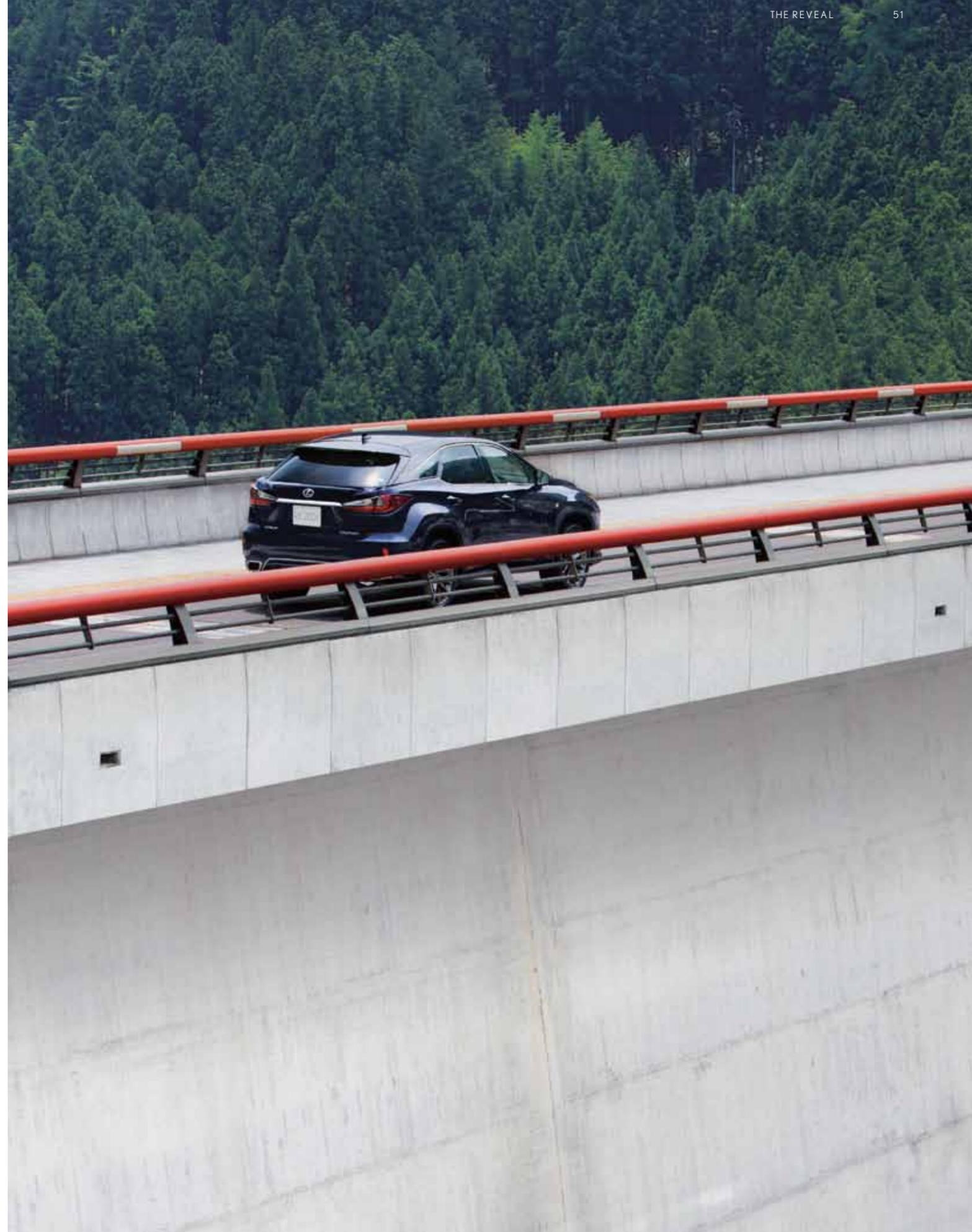
The flowing roofline of the RX characterizes its elegant wind-cutting shape, while the spoiler mounted to the roof and the chrome exhaust tips convey its sporty nature.



ARMED WITH A DISTINCTIVE DESIGN INSIDE AND OUT, THE RESTYLED RX REDEFINES THE LUXURY SUV SEGMENT. A NEW TURBOCHARGED 2.0-LITER INLINE-4 ENGINE, INTENDED FOR SELECT MARKETS, JOINS THE REENGINEERED 3.5-LITER V-6 AND HYBRID POWER TRAIN. THE FOUR-CYLINDER POWER PLANT HAS BEEN TUNED TO PROVIDE POWERFUL LOW-END TORQUE AND EXCELLENT FUEL ECONOMY. OTHER HIGH-TECH FEATURES INCLUDE DIRECT INJECTION AND ENHANCED THERMAL EFFICIENCY.

RX	
LENGTH	4,890 mm
HEIGHT	1,710 mm
WIDTH	1,895 mm
WHEELBASE	2,790 mm
SEATING CAPACITY	5 person
DRIVEN WHEELS	Front, AWD
ENGINE TYPE	Turbocharged 2.0-liter inline-4
CYLINDERS	4
ENGINE OUTPUT	175 kW / 4800-5600 rpm
TORQUE	350 Nm / 1650-4000 rpm
TRANSMISSION	6-speed automatic (6 Super ECT)
SUSPENSION	Front: MacPherson struts Rear: Trailing arm type double wishbone
TIRE	235 / 55R20

Product and specifications may vary by country





CIRCULAR CITY

More than 50 years ago, Chicago architect Bertrand Goldberg designed a novel residential complex that redefined urban living. Laurence Lowe reports on a structure that continues to make its mark on the city

Text by Laurence Lowe
Photography by Adrian Gaut

PIT STOP



Left: Bertrand Goldberg's iconic structures seen from across the marina, which sits on the north bank of the Chicago River.
Right: Marina City up close. The parking garages run fully exposed from the plaza level to the 19th floor. The 20th floor contains a laundry room, and floors 21 through 60 contain private apartments (which were converted into condos in 1977).



The dream of Marina City was founded just over a half century ago on the north side of Chicago. Conceived as a city within a city – a novel idea at the time – the mixed residential-commercial complex consists of five structures, all staged on a river-facing raised platform, with a marina underneath. Its twin 90-story towers materialized in 1964 like a beckoning mirage: they were the tallest reinforced concrete buildings in the world and the first circular apartment buildings ever constructed, each one featuring a fully exposed parking ramp that runs between the plaza level and the 19th floor. Even before the West Tower was completed, *Time* magazine touted Marina City as “Chicago’s most amazing [structure] since the 1893 Ferris Wheel.”

Now widely known for resembling corncobs, Marina City’s twin residential towers endure as an architectural landmark, a must-snap subject of Instagramming tourists and a pop culture fixture. (Perhaps you saw their likeness wreathed in smoke and ash in *Transformers: Dark of the Moon*, or in last year’s pictures of the high-wire artist Nik Wallenda wearing a blindfold while crossing a tightrope from the West Tower to the East Tower.) But to fully inhabit the dream that was Marina City, you have to look past the towers – back to the visionary function that these iconic forms were built to serve.

The late architect Bertrand Goldberg, a native Chicagoan who apprenticed in the Berlin office of Ludwig Mies van der Rohe, designed Marina City as a bulwark against suburban flight. “Marina City has been called revolutionary,” Goldberg once remarked, “but I do not believe along with Corbusier that things are revolutionized by making revolutions. The revolution lies in the solution of existing problems.” When construction on Marina City began in 1959, the idea of raising a family in Chicago (or any other major urban center) was no longer desirable. Owning a house and a car in a quiet, carefully manicured outlying community had become part and parcel of the American Dream. The suburbs promised backyards, better schools, and private garages. Some men drove to their offices in the city; others commuted by train, leaving the car at home with their wives to run errands and ferry the children around. Meanwhile, the influx of cars bedeviled urban planners, especially in Chicago, where the high water table makes underground excavation prohibitively expensive.

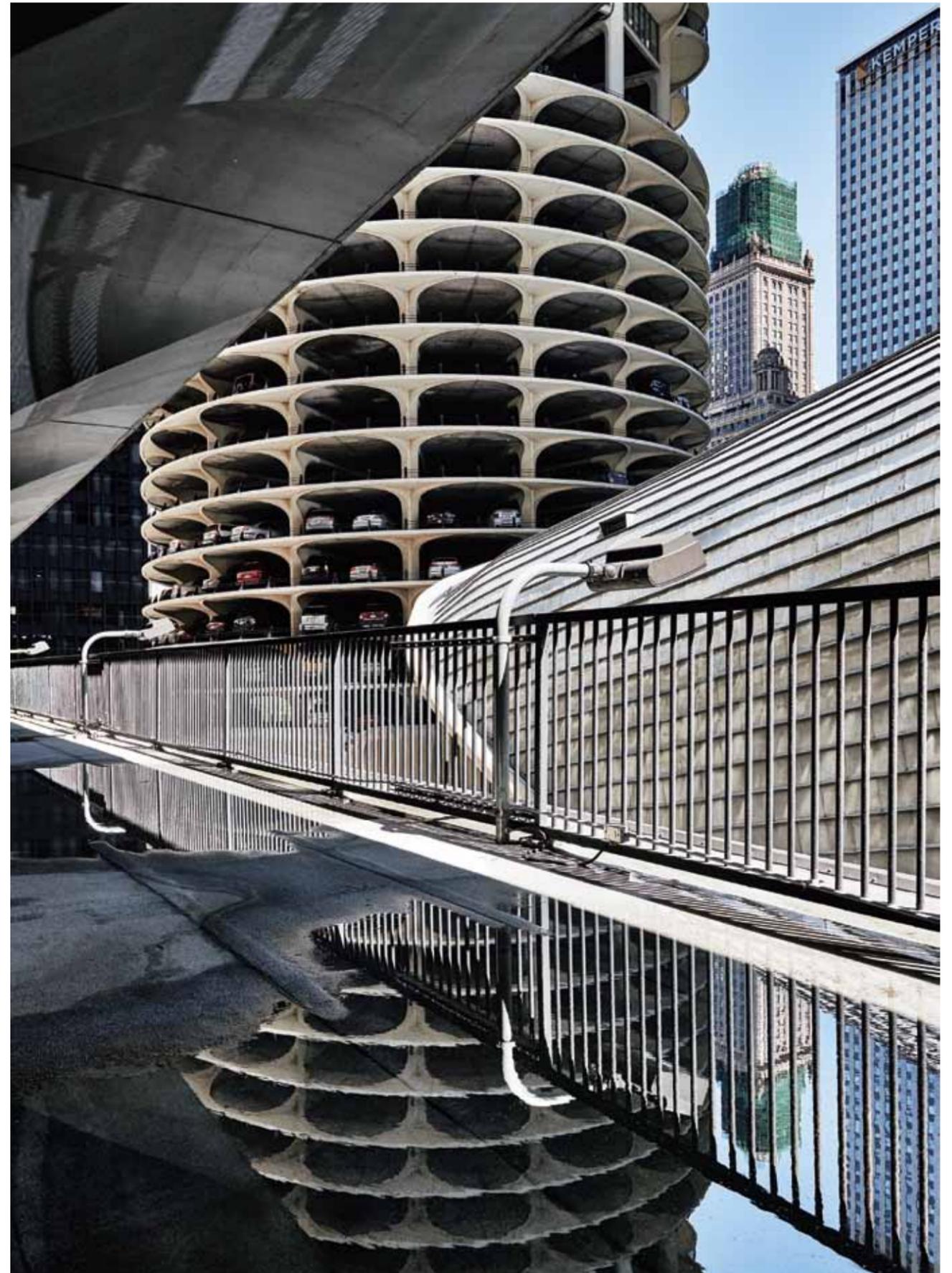
Marina City offered all the amenities of the post-war domestic ideal from the moment you stepped outside your door. It wasn’t just convenience that lured 2,500 applicants for 896 apartments – Marina City created an opportunity to be part of a bold new 24-hour community. It was refreshingly inclusive: in 1964 *Ebony* magazine profiled six of the residence’s original African American ten-

ants, including a 30-year-old real-estate agent who “had sought similar housing in [the Chicago suburb of] Evanston and was turned down because of his race.” Beyond the spectacular view from one’s private balcony, securing a coveted spot in Marina City came with access to the on-site office building, where residents were encouraged to work; to the saddle-shaped performing arts theater; to the namesake marina, which promoted a more active engagement with the long-ignored river; to a gourmet grocery store, a swanky cocktail lounge, a skating rink, a florist, a pharmacy, a swimming pool, a health club, a bowling alley, and – perhaps most crucial to the overall experience – a convenient place to park one’s car. No suburbanite whom Goldberg hoped to lure back to the city was about to give that up, so the architect designed a fully exposed parking ramp to showcase one of the most prestigious perks of Marina City living. The ramp was and remains valet run, with cars uniformly parked in 32 spaces along the circumference of each level (900 spaces in total). Their rears proudly face out at the city.

“Before Marina City, you didn’t ever get expression of the garage in city apartment buildings – it was more like New York, where garages are kind of tucked away,” says Christopher Groesbeck, a principal at the global architecture design firm VOA Associates, and an adjunct professor at the Mies-founded College of Architecture at the Illinois Institute of Technology. “When you’re across the river, you



Above: A peek at Marina City’s iconic parking ramps, whose circular forms differentiate the towers from others in the area. Below: The towers from street level. Right: Another view of the parking garages. To help residents, a crack team of valets (four during the day, two at night) back every car into one of 32 spaces along the circumference (roughly 900 in total).



can see the cars. That's part of the modern movement altogether – to not deny the actual functions within the building and in some way make them part of the form. The parking garage contributes to Marina City's civic presence."

Groesbeck, who was born and raised in Chicago, still remembers Marina City's immediate impact. "It became an icon of Chicago," he says. "It had a very romantic image. It wasn't some wood-frame house out in the suburbs. It engaged the idea that urban living could be different – that it could be exciting and dynamic. It was something that everyone embraced."

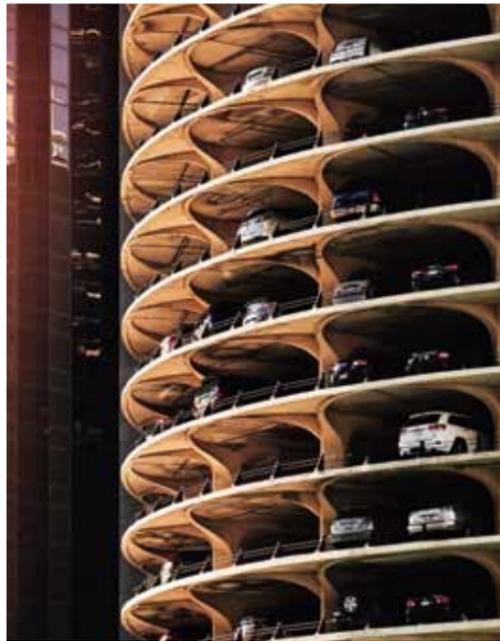
After 50 years of gravity-defying one-upmanship, Marina City no longer occupies pride of place. The John Hancock Center, with its unparalleled observation deck, supplanted Marina City as the tallest building in Chicago; the Sears Tower (now the Willis Tower) supplanted the Hancock, becoming the tallest building in the world (now the second tallest in the United States); then the Trump International Hotel and Tower, a 98-story steel-and-glass



behemoth, moved in next door. While unobstructed views are now harder to come by, Marina City still stands apart, both inside and out, provoking the shock of the new. Nearly all the apartments are occupied, though they were converted into condos in 1977, and Marina City's commercial properties, including the two garages, were spun off under separate ownership. The office complex is now the luxury Hotel Chicago Downtown. The skating rink was demolished to make way for a Smith & Wollensky steak house. The theater is a House of Blues. After kicking off a nationwide urban residential renaissance, Marina City inevitably changed with the times.

In 1992, five years before he passed away, Goldberg reflected on Marina City's evolution. "Living is not just shelter," the architect said. "It is a quality of environment that enhances the ability of people to act on their own and develop whatever they are

Right: Car rears face outward toward the city as dusk approaches in Chicago.



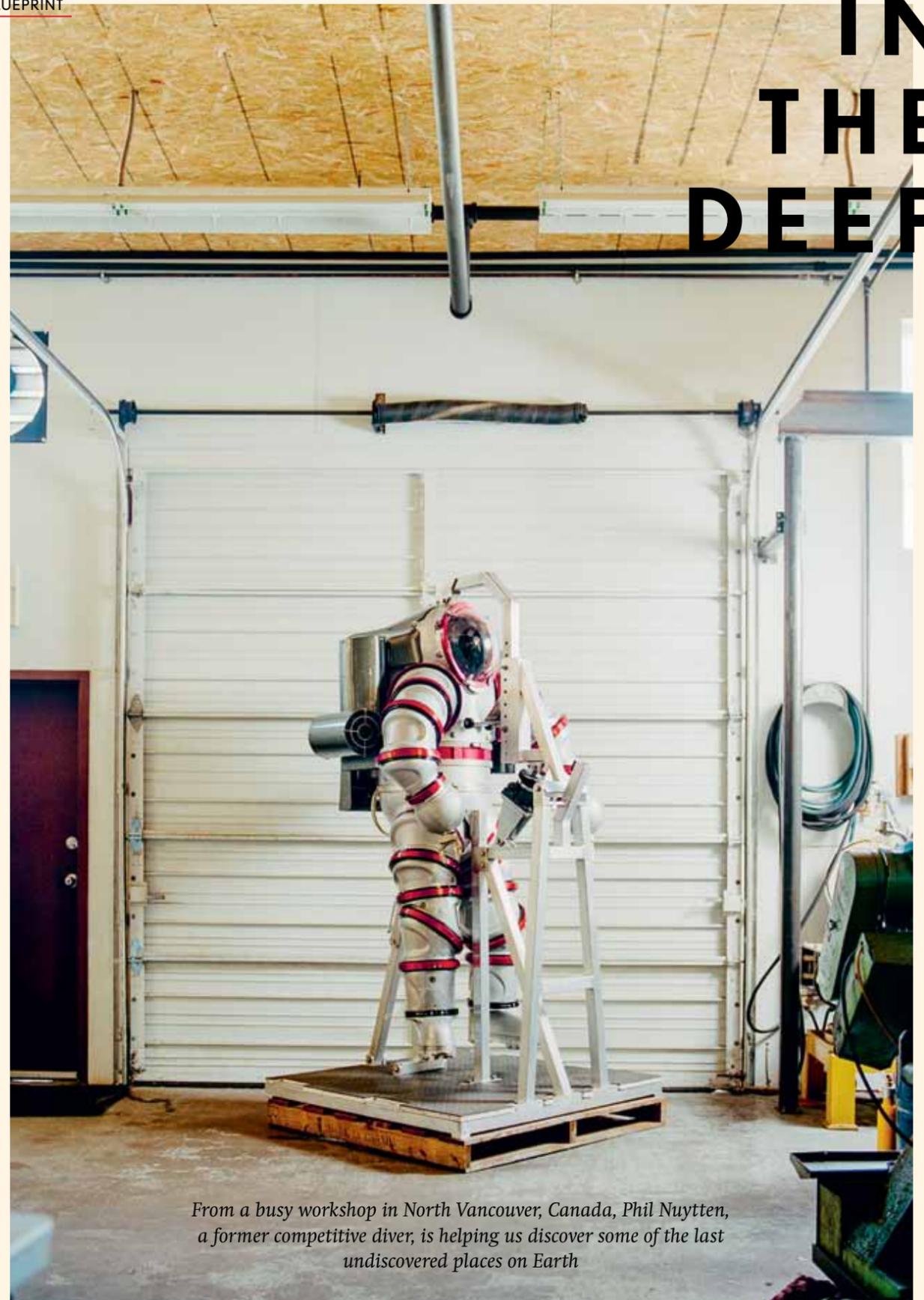
capable or desirous of developing. I did not try to dictate how they would develop various things." Goldberg was nonetheless "very pleased" to learn that some of the tenants had founded a newspaper. The now-defunct *Marina City News* published profiles of residents (including the chief photographer for the TV show *Wild Kingdom*), hyperlocal ads (Marina City Beauty Salon, a hypnotist who lived in the West Tower), and remembrances by the original tenants. ("We enjoyed being pioneers," wrote one, "and had a feeling of warmth and spirit of camaraderie with our neighbors much [like what] the early settlers of Chicago [must have experienced].")

And so it's a shame that Goldberg, who welcomed all such efforts at community building, never had the chance to meet Marina City's current resident historian, Steven Dahlman, who runs the indispensable website Marina City Online (to which this author is enormously indebted), and who has researched, written about, and photographed his adopted home nearly every day for the past 10 years. "When I first came to Chicago," Dahlman says, "I would always gravitate to this part of town. I would stand on the other side of the Chicago River, and I would look at Marina City, and just be mesmerized." When he walks around the complex today, Dahlman greets nearly every passerby with a warm handshake. In Dahlman, and in all his fellow tenants, the dream of Marina City lives on.

"I firmly believe that the concept of total environment creates a pleasurable experience for the occupants," Goldberg declared during the early days of construction. "St. Augustin said that beauty is that which gives pleasure. I do not know if that which gives pleasure is also beauty. But we are closer to our objective by creating the pleasurable total life." ☉

Above: The towers among other Chicago buildings. Since Marina City was built, the city has been developed around it.

BLUEPRINT



IN
THE
DEEP

From a busy workshop in North Vancouver, Canada, Phil Nuytten, a former competitive diver, is helping us discover some of the last undiscovered places on Earth

Text by Jonah Weiner and photography by Kamil Bialous

Planted between a parking lot and some auto-body shops along North Vancouver's industrial waterfront is a small, exceedingly unassuming building. It is two stories tall and covered with weathered wood, and its view of the harbor is distinctly unspectacular, obstructed by the machinery of a dry dock across the way. This is the modest headquarters of Nuytco Research, a company with an avowedly immodest mandate: to make machines that can deliver humans into the ocean at greater depths, with more comfort, and for longer stretches of time than ever before.

In the field of ocean exploration, Nuytco's 73-year-old founder, native Vancouverite Phil Nuytten, is legendary. A competitive diver in his adolescence, he had spent enough time underwater by 1958 that the local police force yanked him from his high school one day to enlist his help with search-and-rescue operations after a bridge collapsed, sending 79 construction workers plummeting into the Burrard Inlet. Something similar happened more recently, after the BP oil spill, when the Environmental Protection Agency called on Nuytten as an expert consultant to help curtail the damage of that catastrophe. His clients over the years have included universities, militaries, NASA, multinational oil concerns, biomedical researchers, and a guy who harvests a rare red coral from the Mediterranean Sea to transform into jewelry. Among Nuytten's friends are the explorer Jean-Michel Cousteau (Jacques' eldest son) and the Hollywood director James Cameron, who used Nuytten's inventions to make several films, including a certain 1997 maritime-themed blockbuster: "That's Jim's brother in one of my micro-sub," Nuytten says, gesturing upward at a large black-and-white photograph hanging from one wall. "He's in the tank where they made *Titanic*."

Nuytten has lively blue eyes and a ready laugh. At 10 a.m. on a hot summer Tuesday, he's wearing chinos, worn loafers, and a short-sleeve shirt



Left: Pieces of Nuytten's diving apparatus. Below left: An antique diving helmet. Below: Nuytten, now 73, in his busy North Vancouver workshop.

decorated with swimming fish. The only conspicuous detail in his ensemble is a yellow-gold Rolex Submariner, gifted to him by the watchmaker in the 1990s. Tucked into his ears are two more marvels of miniature engineering: custom-crafted hearing aids that remedy the deleterious effects of vestibular bends, which Nuytten incurred years ago after ascending improperly from a dive – the injury destroyed his ability to hear certain frequencies, but the hearing aids identify and restore them.

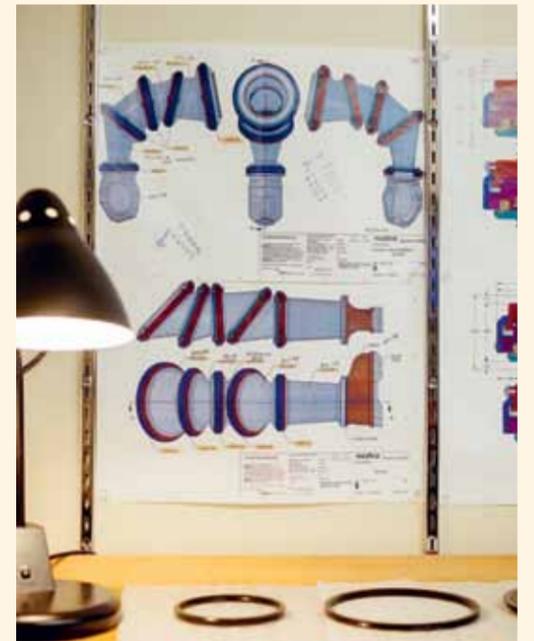
Though he's well beyond retirement age, Nuytten still insists on coming to the office, where he's a relentless tinkerer. In his corner office, he points at a panoramic photograph hung opposite his desk, depicting the shoreline at nearby Whytecliff Park, where he learned to dive as a



boy. "I knew every pebble on that beach," Nuytten says. Over time, tantalized and enticed by the deeps, Nuytten taught himself how to modify secondhand diving gear so that he could descend further and further at Whytecliff, combining an autodidactic streak with an incorrigible bullheadedness. These twinned qualities remain strong in him today, as evidenced by what must be Nuytten's most dazzling invention: a "wearable submarine," as he puts it, called the Exosuit, which recently arrived at market, but which he is still striving, constantly, to improve. "I have a microscopic focus, where everything new I read and everything new I see," he says, "I'm thinking, How could I use this to make the Exosuit better?"

Nuytco's specialty is the design and manufacture of submersibles: its product line includes some half-dozen diving vehicles, some flat-topped and bulging with cycloptic viewing domes (the "Curasub"), others long and winged like fighter jets (the "Orcasub"), and all bearing curved lines, bright coloring, and compact frames that wouldn't be out of place in a Pixar

film. But Nuytco's Exosuits – which sell for about \$600,000 each – embody an obsession that Nuytten has nursed his entire career. In his youth, after working as a commercial diver, he jerry-rigged a suit that had the mobility of scuba gear and the increased diving range of a hard-helmet rig. He liked this hybrid creation, but one problem remained: pressure. "The typical rule is that for every hundred feet of saturation diving, you need to spend 24 hours in decompression," he says. Dive 300 meters, in other words, and you'll have to spend 10 days recovering. Such rituals are miserable for workers, Nuytten says, and costly for their employers. And so, in 1985, having by that point founded several profitable companies devoted to ocean engineering – he made a fortune via '70s-era oil contracts – he invented an Exosuit precursor called the Newtsuit, a relatively limber apparatus that sustained a single atmosphere within itself during a dive, meaning no decompression period was necessary. The Newtsuit, which has been displayed in museums, was lauded as revolutionary, but it left room for improvement. It was noisy, for



Clockwise from top left: A scale model of the Exosuit hangs in the Nuytco workshop; a Nuytco staffer works on an Exosuit joint; Exosuit blueprints are tacked to a workshop wall.



Above: Various elements of the Nuytco Exosuit. The pincerlike appendages (above right) allow divers to carry out complex and delicate tasks.

one, which could make communications difficult, and its narrow-torso design was such that only small pilots could commandeer it. So, over the following decades, along with his other submersibles, Nuytten developed the Exosuit: "I had an idea in my mind like a terrier with a bone, and I wouldn't let it go."

Nuytten walks through a door into Nuytco's hangar-like workshop, where several Exosuits dangle from racks, near towering shelves piled with metal. Nuytco has made eight so far, and there's something of the retro action figure about them. Nuytco fashions them from smooth, bulbous aluminum, articulated by an array of swiveling joints. "Kids see them and love them immediately, because they remind them of Transformers," Nuytten says. As he ambles around, workers in blue jumpsuits circulate busily – certain larger-scale manufacturing jobs are farmed out to bigger facilities, but the core of Nuytco's fabrication happens here. Nuytten heads into a smaller workshop, off the big one, where colorful, pen-marked blueprints are tacked to the walls

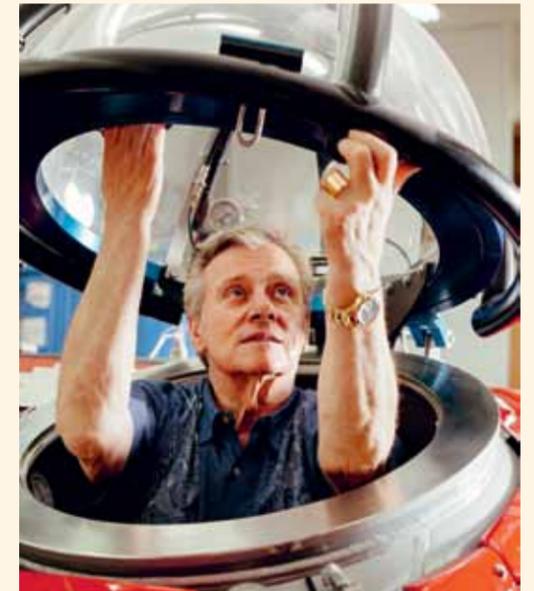


("Don't take any photos of those"), and where a diamond lathe is used to cut the Exosuit's joints. These are the Exosuit's secret weapons: Nuytco has engineered them, he explains, to "eliminate a lot of the pressure differential and at least partially balance" the tremendous crushing force of the ocean deeps, thereby granting the wearer a surprising degree of mobility. The current Exosuit includes a torso that is broader than that of the Newtsuit, a teardrop-shaped dome for an increased field of vision, and sleek, magnetically coupled thruster propellers that operate in "dead silence," he says, and use less power than their precursors. All told, an Exosuit weighs about 320 kilograms – a deep-ocean featherweight. The Exosuit's arms terminate in a variety of pinchers and claws for performing various functions, and a hinged sawtooth blade suggests that a diver wearing one would make a formidable opponent if he ever found himself in an underwater knife fight – indeed, Nuytten notes, the U.S. Navy has asked him to explore developing a "swimmable" Exosuit for use by its SEAL forces. (Other recent clients include the BBC, which loads up Nuytco subs with cameras for the making of programs with titles like *Pacific Abyss* and *Quest for the Giant Squid*.)

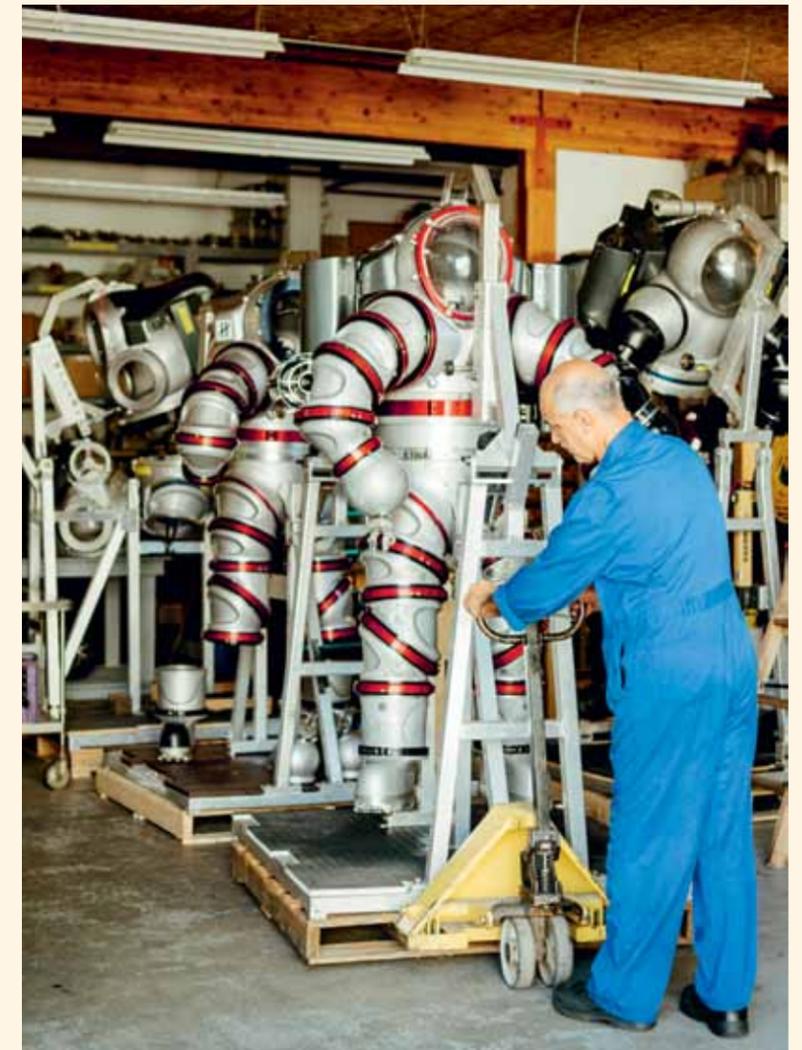


Above: The Dual DeepWorker. Above right: Nuytten inspects a Dual DeepWorker 2000, a two-person submersible that can operate in depths up to 6000 meters. Below right: A Nuytco staffer transports an Exosuit.

THE EXOSUIT'S HINGED SAWTOOTH BLADE SUGGESTS THAT A DIVER WEARING ONE WOULD MAKE A FORMIDABLE OPPONENT IF HE EVER FOUND HIMSELF IN AN UNDERWATER KNIFE FIGHT



Since the Exosuit looks like something out of an Isaac Asimov novel, it's unsurprising to discover that Nuytten's greatest unfulfilled ambition sounds as though he ripped it straight from the pages of a science-fiction paperback: he wants to design and construct a single-atmosphere, deep-water colony, currently nicknamed Vent Base Alpha. This vision represents, in many ways, a culmination of Nuytten's life's work – and of what he has learned about life. "The common wisdom is that humans are so incredibly adaptable – we're so tough, we're like cockroaches – and that's such incredible horse-shit," he says. "We're fragile: we are jellyfishes full of chopsticks, and we have to have the right temperature, the right pressure, to survive." And yet, he goes on, the technology and science exist to harvest not only oxygen for long-term deep-ocean inhabitants but also crops, light, and valuable ores, all by situating a colony near a thermal vent. For several years Nuytten has been making this case to mining companies, but his interest goes well beyond commercial opportunity: "The way we're proliferating on this planet, it's absolutely inevitable that, in the future, we'll have to either get off the planet or get into its soul: into the 75 percent of it that we were denied access to by birth." So far, Vent Base Alpha remains squarely in the pitch stage, but Nuytten says it's anything but a pipe dream. He leans forward emphatically. "It's something that, like most other things," he says, "I fully intend to do." ☉





THE INSPECTION

A Nuytco staffer inspects an Exosuit before it heads out to a client. The suit can weigh up to 320 kilograms and stands more than two meters tall.

THE SUIT

The Exosuit, which was only recently released to market, was developed entirely at Nuytco's North Vancouver workshop. It can comfortably transport its occupant to depths of 300 meters. Ancillary equipment includes an HD camera, which allows audio to be recorded synchronously with video.

Inside the suit, Nuytten has ensured that the occupant experiences the same atmospheric pressure as he does on the earth's surface. The suit's mask is a teardrop-shaped dome, made for an increased field of vision.

The suit is fitted with four 1.6 hp thrusters, which are both quiet and extremely responsive.

In case of trouble, the Exosuit comes fitted with a 50-hour carbon dioxide scrubber (a device that eliminates CO₂) and two oxygen systems, which also have a total capacity of 50 hours.

Illustration by Takashi Saito

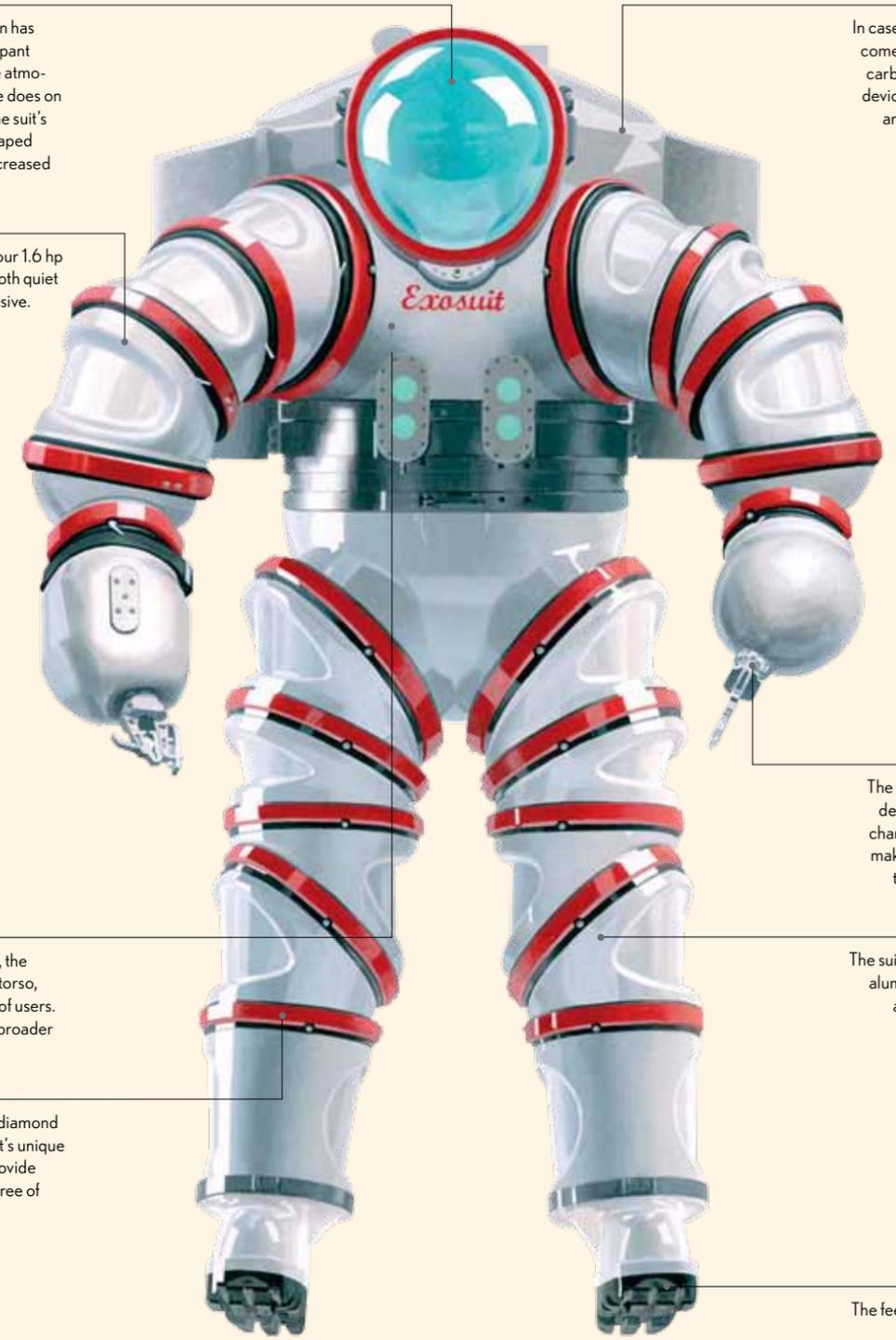
Nuytten's original suit, the Newtsuit, had a small torso, which limited the size of users. The Exosuit's chest is broader and more robust.

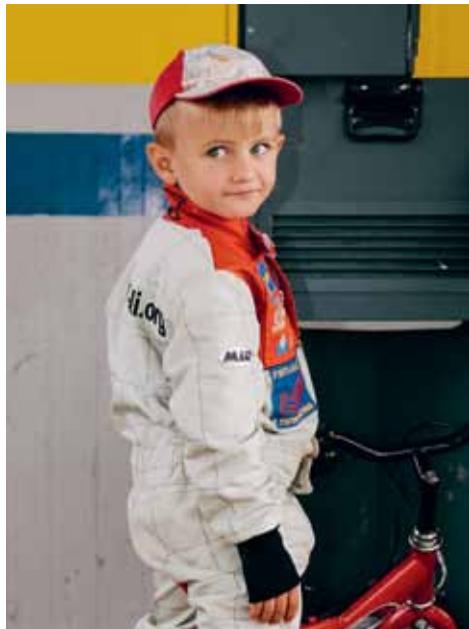
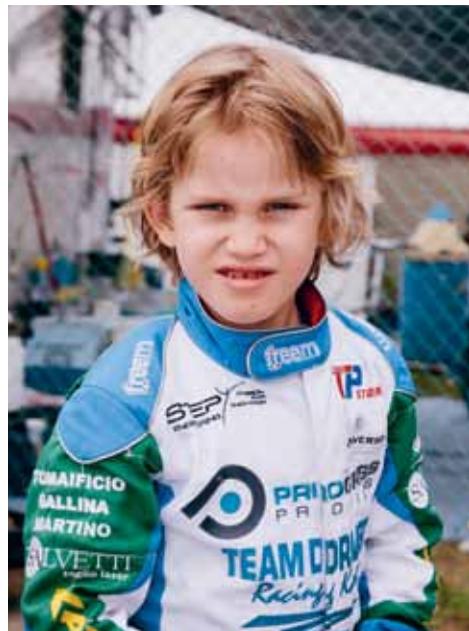
Nuytco staffers use a diamond lathe to cut the Exosuit's unique rotary joints, which provide users with a great degree of mobility underwater.

The Exosuit's bulbous arms descend into a number of changeable pincers, which make intricate underwater tasks easier to manage.

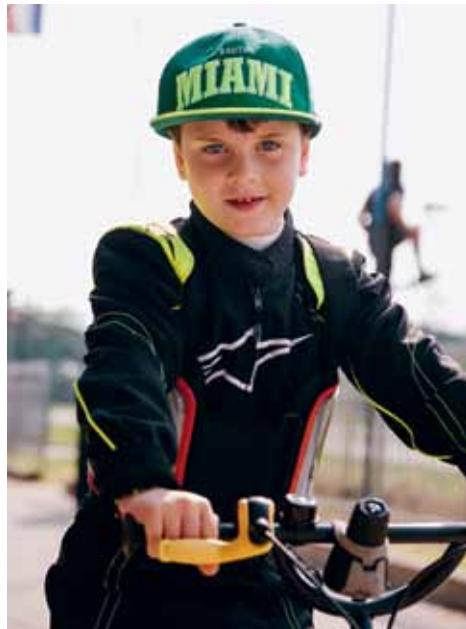
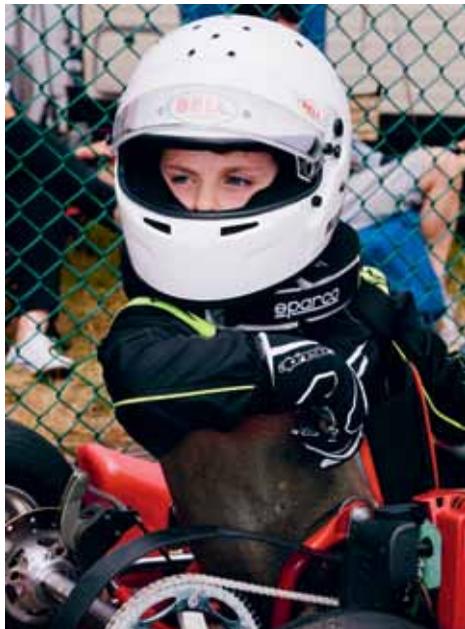
The suit is made from a robust aluminum alloy and weighs around 320 kilograms.

The feet of the Exosuit ensure ocean floor grip.





THE DRIVERS
 There were 13 drivers in Al Dhaheri's field at the Jesolo meet, but numerous other racers competed in different categories. We met a few in the pits.





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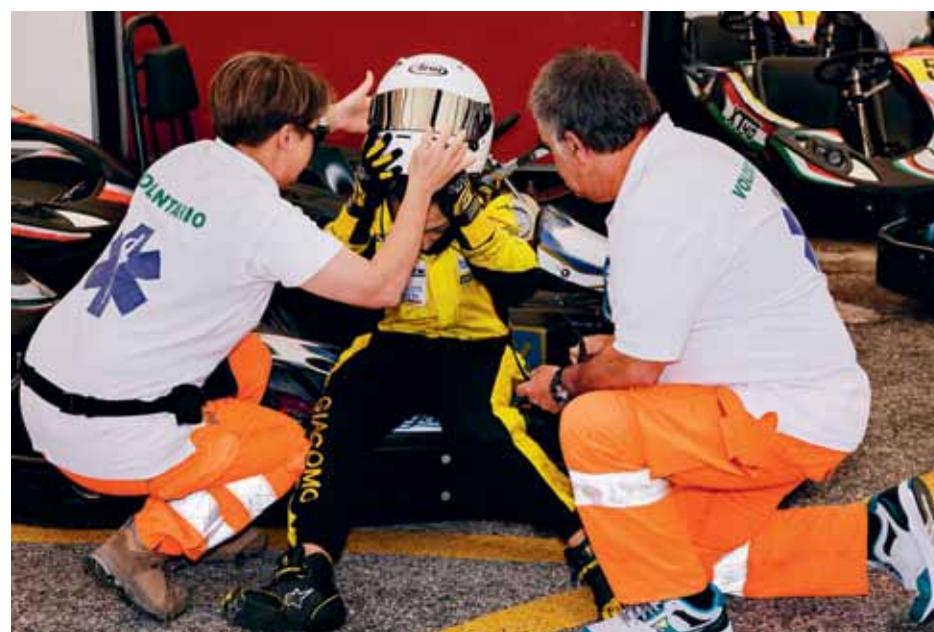
- 1, 2, 3. Drivers (and a lone father) watch events on the track.
- 4. Al Dhaheri, Chatenay and the analyst inspect data.
- 5. Al Dhaheri and Chatenay spectate.
- 6. The team discuss the boy's engine.
- 7. Chatenay instructs Al Dhaheri before a practice session.
- 8. A coach logs lap times.
- 9. Post-crash, a boy is seen to by paramedics.
- 10. In the pit lane, before a race.
- 11. Drivers play with an iPad.
- 12. Inside the team's tent.
- 13. A mechanic tinkers with the engine.



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B O Y

THE ROAD



When Rashid Al Dhaheri was four years old, he decided that he wanted to become a professional racing driver. Now, at the age of seven, he's driving in the right direction. We go on the road with a motorsports prodigy

Text by Alex Moshakis and photography by Jesse Chehak



R A C E R

Rashid Al Dhaheri, seven years old and 127 centimeters tall, has spent almost half of his life mastering the art of driving a go-kart as fast as he can. He has learned to successfully navigate irresistibly tight hairpin turns and broad, sweeping banks. And he has developed the uncanny ability to weave nimbly through a field of fiercely competitive drivers both his age and significantly older, taller, and more mature. He drives with considerable determination, always, as if the lap he's pushing might be his last (perish the thought). When he's not driving, he likes to play video games.

On a Tuesday afternoon in May, Al Dhaheri, a prodigious motorsports talent, stepped into his go-kart and drove onto an asphalt track hot to the touch and dusty with sand. He was at his local circuit, a 1.2-kilometer-long series of technically tricky bends – some tight and severe, others wide and sloping – to practice for an upcoming race. In four days he would travel from Khalifa City, his hometown, just outside Abu Dhabi, to Jesolo, in northeastern Italy, to compete against a group of drivers he started racing in April last year. Last year he outclassed local opposition in the United Arab Emirates, where competition is slow and sparse; now he races mainly in Europe, in a celebrated nine-race Italian championship that is substantially quicker and more aggressive. Because the boy's comparative talents have allowed him to move up an age category, Al Dhaheri is the youngest in his field. Some drivers are a full three years older than him, which matters when you're only seven. "He has to work on his lines," Paul Chatenay, the boy's coach, said. "And then we'll work on overtaking."

Chatenay, who is tall and energetic, prone to lengthening his gait when excited, has been the boy's coach for two and a half years, and the pair quip like old friends. ("I don't consider Rashid just a boy I'm training," Chatenay told me soon after we first met. "He's more like a little brother.") While Chatenay had inspected Al Dhaheri's kart before practice, the duo had chided each other about who is the better driver. Chatenay, an engineer by profession, is an accomplished go-kart racer with international experience. He is also an adult. Still, when training sessions demand that Chatenay drive alongside Al Dhaheri rather than



Left: Al Dhaheri is tended to by his father, Ali, before practice.

instruct him from the sidelines, the races are highly competitive. When Al Dhaheri told Chatenay that he would beat him in practice that day, the elder driver raised his eyebrows, wagged an index finger, and spat out a laugh. It wasn't entirely clear whether what prompted the reaction was amusement, or nerves.

As Al Dhaheri began his first session, 15 minutes alone on the track spent perfecting his relationship with the apex, Chatenay and the boy's father, Ali, watched sweating from a stuccoed platform that ran the length of the finishing straight.



Abu Dhabi is a difficult city in which to comfortably spectate an outdoor sport. It is also a tough place in which to learn how to drive a go-kart. It is oppressively hot almost year-round, and heavily humid. (The temperature that day spiked at 42 degrees Celsius.) Even without the heat, go-karting is both physically and mentally taxing. Over a typical 15-minute session, a driver's body is in near-constant flux, flung from left to right and back again, often violently. A driver's neck, unless supported by a heavy-duty brace, is prone to sprain or worse. And his hands,

forearms, and shoulders – parts of the body used to strain a kart around corners – become tight and rigid with tension. Sessions can become monotonous – specific lines must be followed, lap after lap, lest times suffer – and it can be tricky to maintain concentration. The whole experience is intense, not unlike clutching onto a steerable rodeo bull for a quarter of an hour.

Al Dhaheri seems not to care, either because he is young and still fearless, or because he simply loves to drive go-karts, or both. When I asked him what he most likes about driving,



Left: Al Dhaheri waits in the track garage for his kart engine to regain battery power.

Above: Al Dhaheri jumps into his kart with Chatenay looking on.

polite (he has the habit of flashing wide, toothy grins), he can become irked when pulled from it. When his first session ended prematurely – a flat battery – the boy walked back to the pit, took off his helmet, and slumped into a folding camping chair. Every now and then he would peek over at Chatenay and question the condition of the kart, and every time his coach told him to be patient, the boy crossed his arms and stared glumly at the track.

Chatenay's job is multifunctional. He is at once a coach, a best friend, a big brother, a data analyst, and a social-media marketer (Al Dhaheri is present on various platforms; fans like pictures taken both on and off the track). Today Chatenay played the role of mechanic, and soon he had the boy's kart up and running. In the afternoon's second session, in which the coach planned to take part, Chatenay wanted to work on two areas specifically: rolling starts, which is how champion-

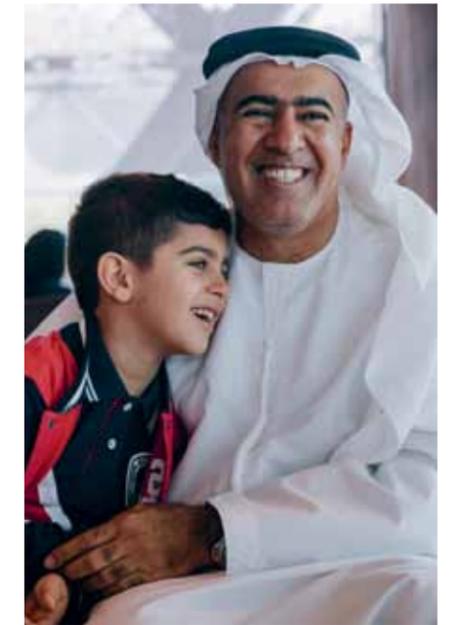
ship races begin in Italy; and overtaking, in which, if Al Dhaheri is going to succeed in professional motorsports, he has to improve. The pair battled over 15 laps, reaching speeds in the straight of more than 90 kilometers per hour. For the first seven, Al Dhaheri drove millimeters from his coach's bumper, hoping to benefit from a slipstream. On the 11th lap, when Al Dhaheri made a move to overtake, Chatenay went wide on a hairpin turn left, and the boy sneaked inside. Then he was gone. "I made one mistake," Chatenay said,

huffing, when the pair returned to the garage. "And it took me two whole laps to catch up."

Al Dhaheri had removed his helmet to reveal a broad smile, and the playful chiding he had given Chatenay earlier had intensified to the point where the older driver was forced to hold his arms up in a kind of mock surrender. Despite the ribbing, Chatenay considered the session a success. Al Dhaheri had shown more aggression than usual, which would give him a better chance against older drivers, who can be unfairly canny.

"IF IT WAS UP TO RASHID, HE WOULD DRIVE ALL DAY"

he faked a moment of thought, and then sputtered out: "The speed." He trains at least twice a week – for up to three hours on a weekday, always after school, in overalls that are the color of the Emirati flag – although he would like to train more. ("If it was up to Rashid," said Ali, who is in charge of balancing his son's calendar between training, parties, schoolwork, family time, and chores, "he would drive all day.") What Al Dhaheri most cares about is being out on the track, and, although he is usually unfailingly



AL DHAHERI HAS BECOME THE EMIRATES'S GREAT HOPE

Chatenay considered a place on the podium feasible, he said, but not altogether likely. Ali agreed. When the boy left his kart and turned away to be driven home, I asked him if he thought he could win in Italy.

He shrugged, then smiled cheekily.

"I'll need some luck," he said. "But maybe."

In a 2011 interview with the British television host Jonathan Ross, the professional racing driver Lewis Hamilton recounted his first driving experience. "I went go-karting when I was five

Above, left to right: Al Dhaheeri out on the track; in the Lexus RC F with his father; and resting during a stretch of downtime.

Left: Al Dhaheeri and his father after the practice session.

years old in Ibiza," Hamilton said, "and I remember that day like it was yesterday: I just had a knack for braking and accelerating, and I've used that knack throughout my career."

Al Dhaheeri displays similar innate talents. He is already quick and smart through turns, and he is gutsy and calculating in a crowd. But he has one significant advantage. Like Hamilton, most Formula One drivers begin racing go-karts at the age of five and older. Al Dhaheeri started when he was four years old, after a Grand Prix visit left him pining for motor-sports stardom. That he began so young is both anomalous and staggering; that, at four, he had the ability to accept complicated direction, adjust his approach, and improve his performance is even more so. (To put that into context: at the age of four, most of us are just about to grasp the benefit of speaking clearly.) His early start is important. In a sport defined by nano-distinctions, measured in the hundredths of a second, any advantage, however slight, can be telling. A 12-month head start might quickly become invaluable.

Still, if Al Dhaheeri wants to make it to Formula One – which he does, it seems, very much – talent alone will not be enough. To have a shot, drivers must progress from go-kart circuits

through Formula Four, Formula Three, and GP2 series. The higher the level, the crueler and more intense the competition becomes. Commitment is essential. So, too, are resources. It takes money to fly regularly across the world; to invest in bigger, quicker karts and bigger, better equipment; to employ coaches and mechanics on longer-term contracts. Al Dhaheeri is fine for now. The logos of Emirati sponsors – banks, oil companies, parts suppliers – feature on the boy's kart, generating revenue that helps Ali, an oil and gas senior executive, fund trips. And although local support is not guaranteed, it is likely to continue. In a country enamored of motorsports but without a competitive homegrown driver, Al Dhaheeri has to many become the region's great hope.

At the Al Forsan circuit, Chatenay had suggested that his trainee has a decent chance of reaching an elite level. But he was careful not to overplay the prospect. "Think about [what it takes to become] a professional footballer," he said. "There are 23 players in each of the squads of 20 top teams



Above: The Lexus RC F approaches the Al Forsan circuit.



in every division across the world. More than 400 players, at least.” He paused, then shrugged. “Now think about Formula One,” he said. “There are 20 drivers, maybe 22.” Another pause, this one more reflective. “Twenty-two,” he repeated. “That’s it.”



The Jesolo leg of the Italian championship is the fourth in the tournament’s series. It takes place over one weekend (practice sessions on Friday and Saturday, races on Sunday) at Pista Azzurra, a storied go-kart circuit on which a number of Formula One drivers competed as kids. Lewis Hamilton raced here. So did Alain Prost, Ayrton Senna, Michael Schumacher, Giancarlo Fisichella, Robert Kubica, and Luca Badoer. “Nico Rosberg is German,” Chatenay told me, but, because he spent so much time racing in Italy as a kid, “he speaks Italian fluently.” The families of young prospects from outside Italy have been known to relocate to the country to be closer to the competition, which is considered one of the world’s best. Even by the time he is seven years old, where a driver is located can already be crucial.

Chatenay was standing in an open-air café that overlooked the track, holding race registration forms. He had arrived with Al Dhaheri and Ali the night before, Thursday, and now the team was waiting for a field of rental drivers to finish a recreational session, at which point the boy could begin logging his own laps. Al Dhaheri was boisterous, already suited in his overalls. He was dividing his downtime among eating pizza, recording the lap times of rentals on the track (“That one’s fastest”; “Ooh, now that one’s quickest”), and playing Minecraft.

Chatenay likes to arrive at race meetings early, before the place fills up, campsite-like, with local drivers, at which point track access becomes limited. Practice sessions are crucial for Al Dhaheri. He has learned to drive on dry, sandy circuits on which karts have a tendency to drift. In Italy, because it is colder, asphalt offers more grip, which makes tracks quicker and requires a driver to take different lines. Unlike his Italian challengers, Al Dhaheri needs time to familiarize himself with not only the specific intricacies of a circuit but also the weather conditions, which can shift quickly. The forecast for Sunday hinted at sun, but clouds overhead looked ominous and persistent. Al Dhaheri loves to drive in the rain – “It’s very slippery,” he told me, “and very fun” – but he has done so less than he needs to genuinely

Above: Coaches and family members overlook the Jesolo circuit.

Opposite: Al Dhaheri and Chatenay battle it out on the boy’s home circuit.

compete on tracks affected by water. “Something to think about,” Chatenay said.

When the rental group finished, Al Dhaheri walked to the temporary tent in which his kart was stored and began to prepare for a practice session. When the boy is on the road, his team grows significantly to include a couple of mechanics, who adjust setups until race day; an analyst, who inspects data compiled by sensors fitted to the boy’s kart; and a fourth member, whose role is to complete odd jobs nobody else has time for, and whom I rarely saw without a screwdriver. The team looks after two drivers: Al Dhaheri, the only non-Italian in the field, and a slightly older boy, Valerio Rinicella, who wears his hair in a floppy blond mop, and who was leading the championship. The pair get on, but while Rinicella prefers to spend time between practice sessions with other drivers, racing bikes and scooters around the campsite, Al Dhaheri likes to stay in the tent, where he asks questions, combs through data, and closely observes the work of his mechanics. “It’s part of my job to keep him motivated,” Ali once said of the role he plays in his son’s development. Either he is doing his job very well, or his son is already so motivated that he doesn’t really need to.

When Al Dhaheri drove onto the track for a practice session, Chatenay and the mechanics stood at a perimeter chicken-wire fence, commenting aloud on the boy’s decisions and discussing potential improvements. When the rental group finished, Al Dhaheri walked to the tent and

DRIVERS IN COLORFUL OVERALLS PACED THE PIT AREA, MONITORING THEIR KARTS OR JOSTLING WITH FRIENDS

began assessing data with the analyst. Part of what makes the boy a talented driver is his desire to learn, and his willingness to affect minute changes on the track. When the analyst offered advice, Al Dhaheri listened intently, dangling his legs

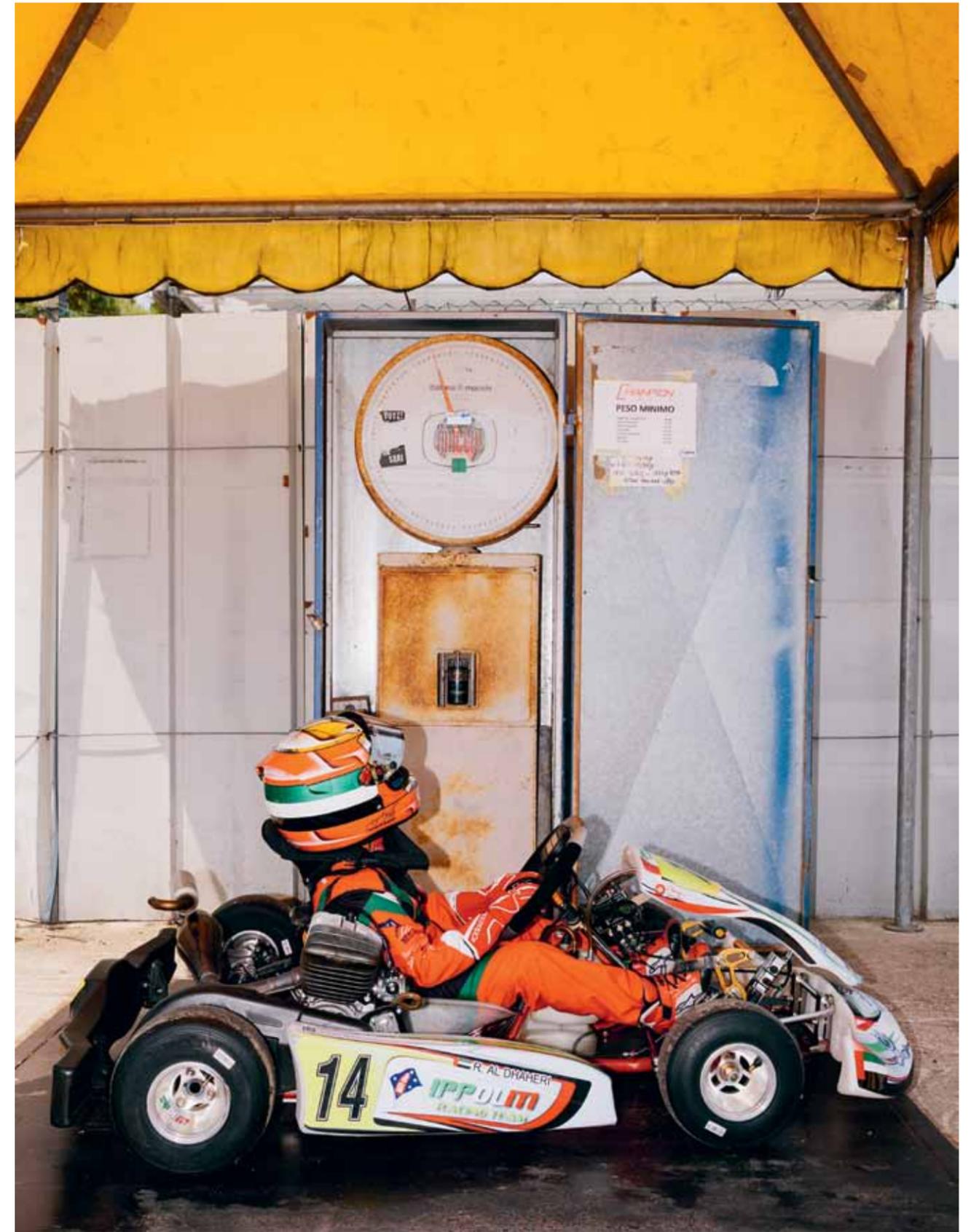
from a folding chair. When he didn’t understand a comment, or if he disagreed with a suggestion, he said so, and an open dialogue ensued.

After another practice session, the analyst began to notice areas for potential improvement. “Pay attention to use full gas on turn one,” he told Al Dhaheri in heavily accented English. “Turn 12 also. Full, full, full. And turn three.” Al Dhaheri nodded. “And turn six is very important on this track,” the analyst continued. “You have to turn late into the apex.” Al Dhaheri nodded again (in silence – he was sucking on a lollipop), and then Chatenay added his thoughts on other bends. “One, ten, 12,” he said. “If you don’t put your foot down, they’ll pass you like a chicken.”

Above: Chatenay and a mechanic tend to Al Dhaheri’s kart before a practice session.

This process continued for the rest of the day: data was recorded and analyzed, and Al Dhaheri applied marginal changes on the track, all for slight incremental gains. (“Better,” Chatenay told me during one session. “We’re at 56.7” – seconds per lap – “rather than 56.9.”) When the boy waltzed into the tent after his penultimate session, the analyst sketched the optimum driving line onto

Left: Valerio Rinicella, Al Dhaheri’s Italian teammate.



Above: After a qualifying session, Al Dhaheri and his kart are weighed.



an A4 printout of the track and explained further complexities. Chatenay encouraged Al Dhaheri to do the same, to make sure he knew exactly which routes he should be taking through corners and at what speed. When the boy was done, he looked up and smiled as if he had completed his homework early. In addition to the driving line, he had made a note of the places at which he should fully apply his throttle for maximum speed. Along the finishing straight, he had simply scrawled “fulgas.”

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As the weekend progressed, more and more drivers arrived for the main event, to the extent that, on Sunday morning, the track evoked the atmosphere of a carnival. Drivers in colorful overalls paced the pit area, monitoring their karts or jostling with friends. Motor homes parked in neat rows behind team tents bustled with large families. Parents monitored their children passively from afar; younger siblings (too young to stay home) played with iPads. As the races began, one mother pushed a pram across a stretch of grass behind the track, presumably in an effort to lull her child, who was wearing oversize ear defenders, to sleep. It did not seem to be working.

Al Dhaheri’s mother doesn’t frequently travel to overseas races with her son, and, of the boy’s parents, she is the less enamored of his participation in a sport that can be extremely dangerous. (She is in no way against karting, but she does put education first. In Al Dhaheri’s bedroom, which is painted Ferrari red, shelves are mostly lined with racing ephemera, but one section is dedicated entirely to school certificates.) Halfway through a practice session on Friday, a driver in Al Dhaheri’s field had collided with a circuit wall and flipped his kart, which landed, rather unceremoniously, right on top of him. The boy walked away uninjured, and within a couple of hours he was back on the track. Still, the moment highlighted go-karting’s enormous potential risk. Al Dhaheri has never suffered serious injury. Neither has he ever really crashed. “Thank God,” Ali said when I brought the subject up, although he seemed otherwise unperturbed by the prospect of physical harm. Both he and Chatenay share great confidence in the boy’s ability to avoid jeopardy on the track. They have less conviction when he is not on it. As the Sunday races kicked off, Al Dhaheri watched from the top of a fence while his father hovered nervously nearby in case the boy slipped. It was the most concerned Ali had been all weekend.

Left: As the race kicks off, Al Dhaheri, number 14, begins to work his way through the field.



Above: Al Dhaheri and Rinicella watch the award ceremony. Right: The boy with his trophy.

Al Dhaheri, who drives a 60-cc kart, was watching drivers in other fields, most of them older. Race days are a two-pronged affair. Sunday morning lap times determine start positions in a qualifier – a pre-final – which subsequently governs spots in a decider later

that afternoon. Al Dhaheri, who through Saturday had consistently logged the field's quickest laps, had qualified for the pre-final in pole, but between Sunday night and the final race he had encountered a series of problems. His engine, supplied by the race organizers, was shoddy, and his team had needed to replace it. The weather had turned – it was now raining – and the track had become wet and difficult to navigate. And then, in a haze of confusion, Al Dhaheri and his teammate missed the start of Sunday's qualifier, which meant that, for the final race, they would begin last. Al Dhaheri seemed unfazed by the prospect, but the rest of his team appeared more than a little irked. For 30 minutes after the race, while the boy sat in the tent, playing with his father's iPad, Chatenay, Ali, and the rest of the team berated course officials, believing them to have rescheduled the race time without properly informing their team. "Everyone seems friendly," Chatenay said, "but nobody came to warn us, and they only announced the race [over the circuit Tannoy] when they were doing their warm-up lap."

Al Dhaheri's race strategy changed as a result of his new position. Rather than lead from the front, Chatenay asked the boy to hold back, let the group bulk and crash, and then begin the long crawl upward. Which is what Al Dhaheri did. Within

two laps he had moved from 13th to 10th. By the seventh lap he was fifth. And with one lap remaining, he was second. Chatenay and Ali watched from the sidelines, pumping the air with their fists, encouraging the boy to push harder. On the final lap, Al Dhaheri clipped the back of the kart in first place, decreasing his speed. The incident left him in third, which is where he finished the race. Chatenay ran to the paddocks to collect his pupil, and when the pair appeared again back at the team tent, they were close to skipping. "You did good," Chatenay said as Al Dhaheri beamed. "That last lap, you could have kept your foot on the gas" – there is always room for improvement – "but good job, Rashid. You did good." When Ali saw his son, he hugged the boy and then handed him his mobile phone so he could talk to his mother, who was patiently waiting on the other end. "He's shown his maturity," Ali said to no one in particular. "He's shown he's a racing driver."

After the race, the drivers and their parents stood in a huddle around a podium and smiled as racers were awarded large silver-plated trophies. When Al Dhaheri received his, he held it up with his left hand and, as camera flashes sparked, made a victory sign with his right. As soon as he got down, he was ushered to a balcony on which the course photographer was recording interviews with the top-ranking drivers, to be published on the championship's official website. When it was Al Dhaheri's turn, the boy took a microphone and looked briefly at the track, which was empty save for a couple of rental drivers. Now the competition was over, business had resumed as usual. Al Dhaheri took a deep breath. Then he turned to the camera and smiled. ☺



|                         |                                            |
|-------------------------|--------------------------------------------|
| <b>LENGTH</b>           | 4,705 mm                                   |
| <b>HEIGHT</b>           | 1,390 mm                                   |
| <b>WIDTH</b>            | 2,070 mm                                   |
| <b>WHEELBASE</b>        | 2,730 mm                                   |
| <b>SEATING CAPACITY</b> | 4 person                                   |
| <b>DRIVEN WHEELS</b>    | FR                                         |
| <b>ENGINE TYPE</b>      | V8 5.0L (2UR-GSE)                          |
| <b>CYLINDERS</b>        | 8                                          |
| <b>ENGINE OUTPUT</b>    | 351 kW / 7100 rpm                          |
| <b>TORQUE</b>           | 530 Nm / 4800-5600 rpm                     |
| <b>TRANSMISSION</b>     | 8-Speed Sport Direct Shift                 |
| <b>SUSPENSION</b>       | Front: Double Wishbone<br>Rear: Multi-link |
| <b>TIRE</b>             | Front: 255 / 35R19<br>Rear: 275 / 35R19    |

## RC F

For this issue's Road story, we took a Lexus RC F to Abu Dhabi, the capital and second-most populous city in the United Arab Emirates. The new RC F, a high-performance coupe launched at the 2014 North American International Auto Show, is equipped with a 5.0-liter engine as well as an active rear wing, cooling ducts, and carbon fiber components.

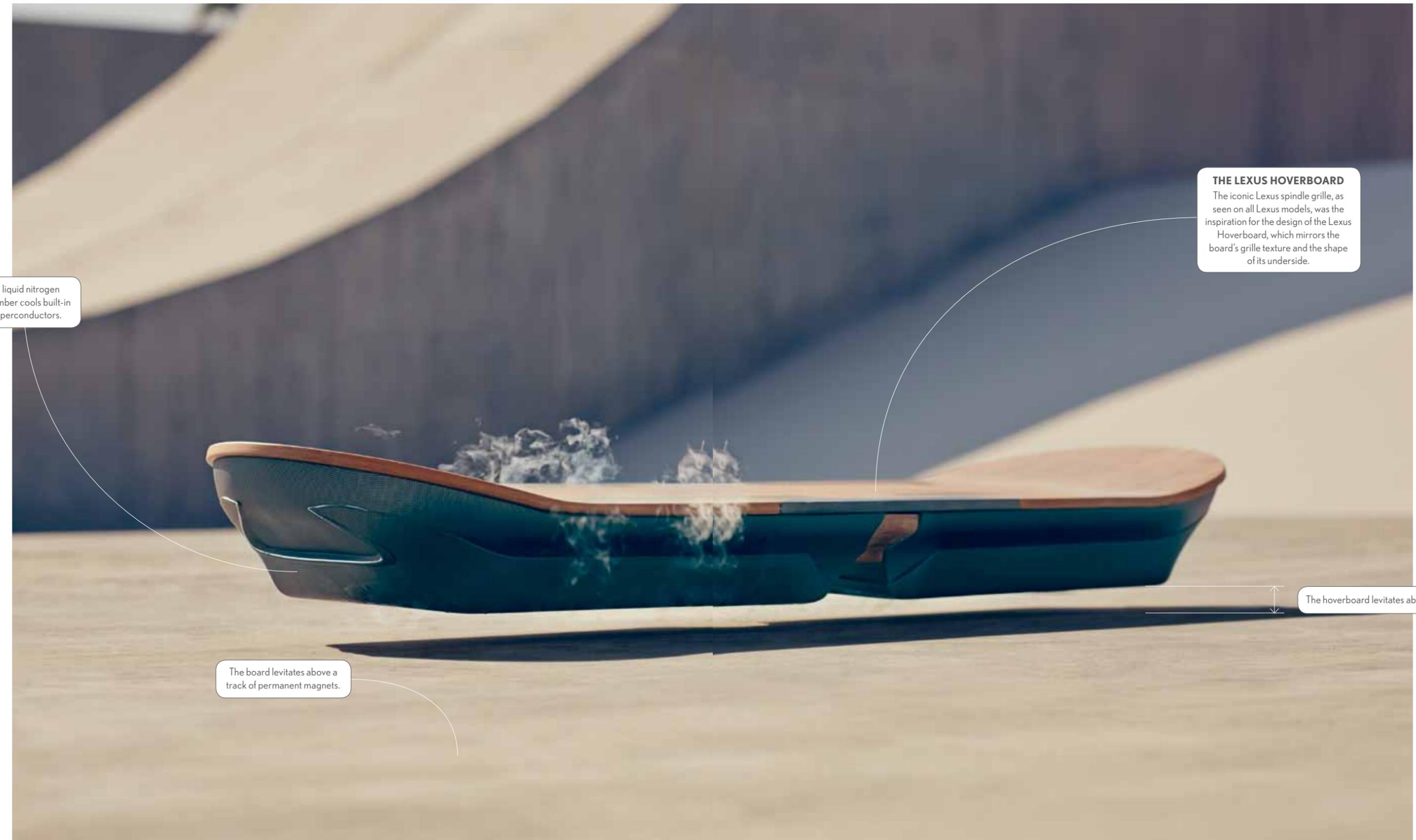
Product and specifications may vary by country



# SCIENCE

# NON-FRICTION

THE REPORT



A liquid nitrogen chamber cools built-in superconductors.

#### THE LEXUS HOVERBOARD

The iconic Lexus spindle grille, as seen on all Lexus models, was the inspiration for the design of the Lexus Hoverboard, which mirrors the board's grille texture and the shape of its underside.

The board levitates above a track of permanent magnets.

The hoverboard levitates above ground.

*For most of us, levitating trains and hovering skateboards seem plucked from a work of science fiction. At one German institute of metal physics, however, they have become a reality*

Text by Annick Weber  
Photography by Laurent Burst



**THE RESEARCH FACILITY**

The warehouse in which the IFW constructs levitating transport systems is located in an industrial zone in Dresden-Niedersedlitz. It dates from the late 19th century and was once the home of the Sachsenwerk – one of the first manufacturers of electric motors in Europe.

The Lexus Hoverboard was made with hundreds of these superconducting YBCO bulks.

Nothing about the humble warehouse on the outskirts of Dresden, in eastern Germany, indicates that, behind its walls, research is being carried out that might affect the way we get from A to B in the future. Since the early 2000s, a group of scientists at the Institute for Solid State and Materials Research (IFW) has been occupying the sprawling, century-old premises, spearheading the worldwide development of innovative vehicles carried by one physical phenomenon: superconductivity.

“Certain materials reach superconducting state when cooled to very low temperatures,” explains Dietmar Berger of the IFW, pointing at a glass shelf filled with metal bulks in different shapes and sizes. At minus 180 degrees Celsius and under, these composite materials – among which a compound of yttrium barium copper oxide (YBCO) is the most common – become superconductors. “There are a number of metals and some ceramics that can be used for superconductivity,” continues

Berger. “Namely, those that acquire the ability to conduct electricity without resistance and expel magnetic fields.”

To anyone other than the researchers at the institute, the result of this phenomenon looks like pure science fiction: when placed above the field of a magnet rail, these cooled magnetic bulks levitate as if weightless.

Convinced that it might be possible to build an entirely revolutionary transportation system with the help of superconductors, the former head of the IFW, Professor Dr. Ludwig Schulz, called to life a research project undertaken back in 2002. The principle had already been used in toy train sets since the 1990s. Why not apply it to a real-life railway system? Schulz reasoned.



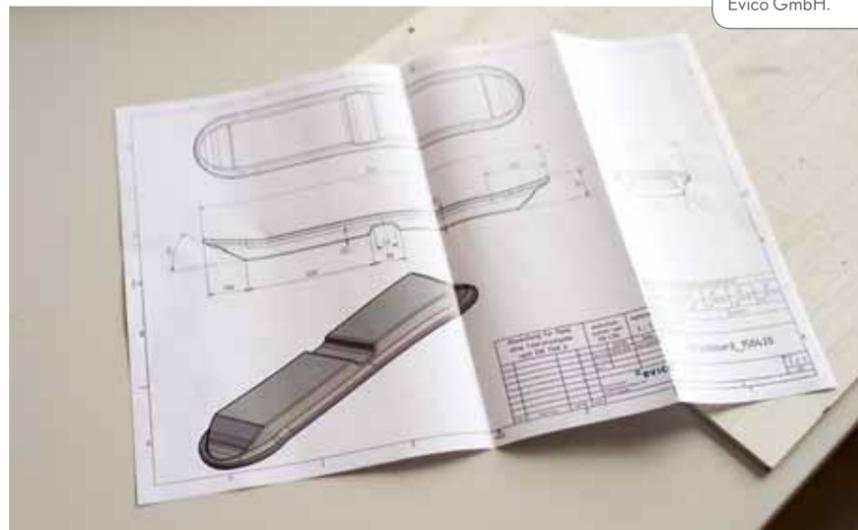
The SupraTrans II has been presented at mobility fairs, at universities, and on TV shows around the globe, breaking new ground in metal physics.

The design and construction of the Lexus Hoverboard was carried out in the Dresden facility by the IFW and Evico GmbH.

Dr. Oliver de Haas



All aboard the SupraTrans II: the 400-kilogram train can levitate about 10 millimeters above its oval track.



**TO ANYONE OTHER THAN THE RESEARCHERS AT THE INSTITUTE, THE RESULT OF SUPERCONDUCTIVITY LOOKS LIKE PURE SCIENCE FICTION**



**HOW IT WORKS**

Superconducting levitation requires three crucial elements: one, a metal or ceramic bulk, known as the superconductor; two, liquid nitrogen to cool the bulk and make it magnetic; and three, a permanent magnet track above which the bulk can levitate.

With planning for a hovering train powered by electromagnets – the maglev – already afoot in Japan, it became Schulz’s ambition to prove that the same could be done with superconductors. Seven years and a first-generation prototype later, his brainchild has become a reality.

In 2012 the outcome of his group project was introduced to the public. Formally known as Test Drive Facility SupraTrans II, the open-top two-seater train quickly received the moniker Flying Carpet, for obvious reasons. Instead of wheels, it was equipped with ceramic superconductors chilled to below minus 180 degrees Celsius by liquid nitrogen. The vehicle’s cooled underside became magnetic, allowing it to “fly” smoothly, without friction from a surface, above a rail made of permanent magnets. With 10 liters of liquid nitrogen, the 400-kilogram vehicle could levitate and maintain speed about 10 millimeters above the 80-meter circular track for up to 24 hours – the maximum period during which temperatures could be kept low enough for the superconductors to retain their magnetic strength.

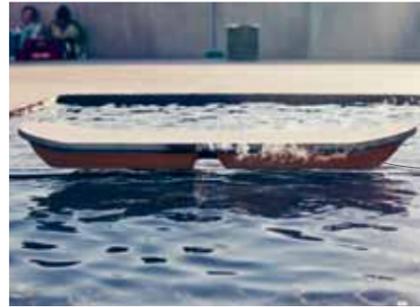
“It may look complex, but in fact all it takes to let our system float through space are three components,” says Dr. Oliver de Haas of Evico GmbH, a partner firm that jointly developed the system with the IFW. De Haas walks along the narrow rail that circles most of the warehouse’s ground floor, and then takes a seat in the SupraTrans. “Firstly, we need a permanent magnet in our track,” he says. “Secondly, a superconductor, which can act as an

The key to bringing out the magnetic capacities in a superconductor is temperature: anything cooler than minus 180 degrees Celsius works. Liquid nitrogen, shown here, causes rapid freezing.



“BUILDING THE LEXUS HOVERBOARD REQUIRED US TO PUSH BOUNDARIES”

The magnet track, buried beneath a custom-built Barcelona skate park.



Above ground and over water, the hoverboard glides around the skatepark.

No effort was spared: an entire skate park with ramps, rails and jumps was constructed for the “Amazing in Motion” campaign.



opposing magnet for a certain period of time. And lastly: liquid nitrogen to cool the superconductive substance and bring out its magnetic proportions.”

With these pillars in mind, the scientists went on to investigate further applications for superconducting levitation. It is down to just a handful of pioneering institutes worldwide – among them the IFW; there are others in Brazil and China – at which the principle is being researched for future implementation in science laboratories to move around test tubes containing toxic substances. In order to prevent any contact with human hands or other surfaces, levitating logistics systems could also be used in industrial environments where nuclear, radioactive, or other contaminated by-products are handled.

While contactless levitation will most likely be applied for the transportation of goods in the near future, the IFW hasn’t neglected Schulz’s initial interest in “flying” modes of transport for people, either. In October 2014 the scientists at the IFW were tasked to design and construct a human vehicle that none of them could have dreamed of developing: a hoverboard for the latest Lexus “Amazing in Motion” campaign. The scientists took the functional principle of the SupraTrans II train as a base and crafted a levitating hoverboard,

not unlike the one that Marty McFly rides in the cult science fiction comedy *Back to the Future*. The wheel-less bamboo board had its world premiere on set in Barcelona, where professional skateboarder (and now hoverboarder) Ross McGouran performed tricks without touching the ground. The secret was an invisible magnetic track buried beneath a skate park’s ramps and curves, above which the board’s built-in superconducting magnets floated fluidly.

Not only did the result look spectacular, but the project marked a milestone for the institute’s further research, too. “Building the Lexus Hoverboard required us to push boundaries,” says Berger, who was involved in the project from initial concepts to final execution. “For the first time, we were working with an ascending track – and when we saw that the board

could indeed levitate uphill, we knew that what seemed impossible could be made possible. Who knows? One day entire cities could be equipped with magnet tracks, allowing people to roam uphill, downhill, and all around in little levitating cabins with zero noise and zero emissions.”

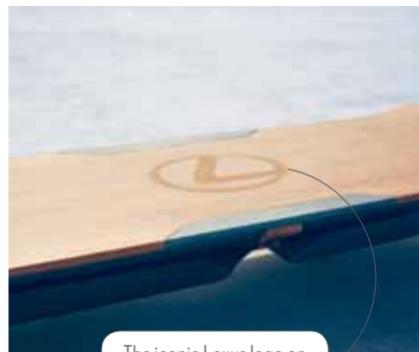
The eyes of an expert: Dietmar Berger analyzes the spectacular result.



There is no such thing as impossible: the hoverboard levitating uphill on a skate ramp.



The iconic Lexus logo on the bamboo deck.



AMAZING IN MOTION

The Lexus Hoverboard was crafted for the fourth project of the Lexus “Amazing in Motion” campaign. As always, motion is at the heart of the film, which this time centers on the dynamic movement of one rider levitating on his hoverboard.



Hoverboarder Ross McGouran.

# MASTERS

THE LAB

# OF

# FORGERY

*In a vast factory 250 kilometers outside Tokyo, a group of craftspeople is forging some of the most sought-after wheels in the world*

Text by Sam Mitani and photography by Go Itami



An aluminum wheel being forged. The metal is heated but not melted, to a point where it is moldable but remains strong.



Above and right: Wheels being made at the Takaoka factory are shown at different stages of the forging process.



Each morning, Masato Sawada, head factory manager of BBS Japan Co. Ltd., walks the floor of the Takaoka wheel factory, carefully examining each workstation and greeting each worker to ensure that operations are running smoothly and high-quality forged wheels are being turned out on time. His “morning stroll” can take up to a few hours. The Takaoka facility is huge and bustling, 38,520 square meters in total, or roughly nine acres of land. It accommodates 300 employees.

“To me, safety is the most important thing here,” Sawada says, “but I also must make sure that there are no delays and our high level of quality standards is being met. My main job is to make sure all the different pieces of our wheel-making puzzle fit precisely and are working flawlessly. That includes the machines – and the people.”

Since its inception in 1970, BBS, a German company, has been one of the world’s foremost wheel makers. Major luxury marques are customers, such as Bentley, Aston Martin, and Lexus. BBS also supplied wheels for the LFA supercar.

While the main BBS headquarters is located in Schiltach, Germany, every single one of the company’s forged wheels is manufactured in Takaoka, Japan, a small city tucked away in Toyama Prefecture, about 250 kilometers from Tokyo. The plant is operated by BBS Japan Ltd., an entirely independent entity from BBS GmbH that began life making sectional beams for industrial knitting machines back in 1971. In 1983, after BBS GmbH discovered the plant’s aptitude in producing specialized round objects from cast aluminum billets, the Takaoka manufacturing facility, once known as Washi Mayer (a.k.a. Washi Beam), became part of the BBS family. Then it dedicated itself exclusively to producing forged wheels.



Before we delve into what it takes to make some of the world’s highest-quality wheels, let us first explain the essentials. A wheel, put simply, is what holds a tire in place, and it comprises a hub, spokes, and a rim. The hub is the center portion of the wheel – it links to the suspension – and the spokes extend from the hub and attach to the rim, the outer part of the wheel, which holds the tire. Most luxury and sports cars are equipped with aluminum wheels, which are manufactured using one of two processes: casting or forging. Cast aluminum wheels, which account for the majority of wheels in use today, are made by melting metal into liquid form, then pouring it into a mold, where it is left to cool. To produce forged wheels, the aluminum is heated but not melted, thereby allowing it to retain its strength; the metal’s molecular composition remains intact. Forged wheels, in which Sawada and his team specialize, are often stronger than their cast counterparts. And they can be significantly lighter.



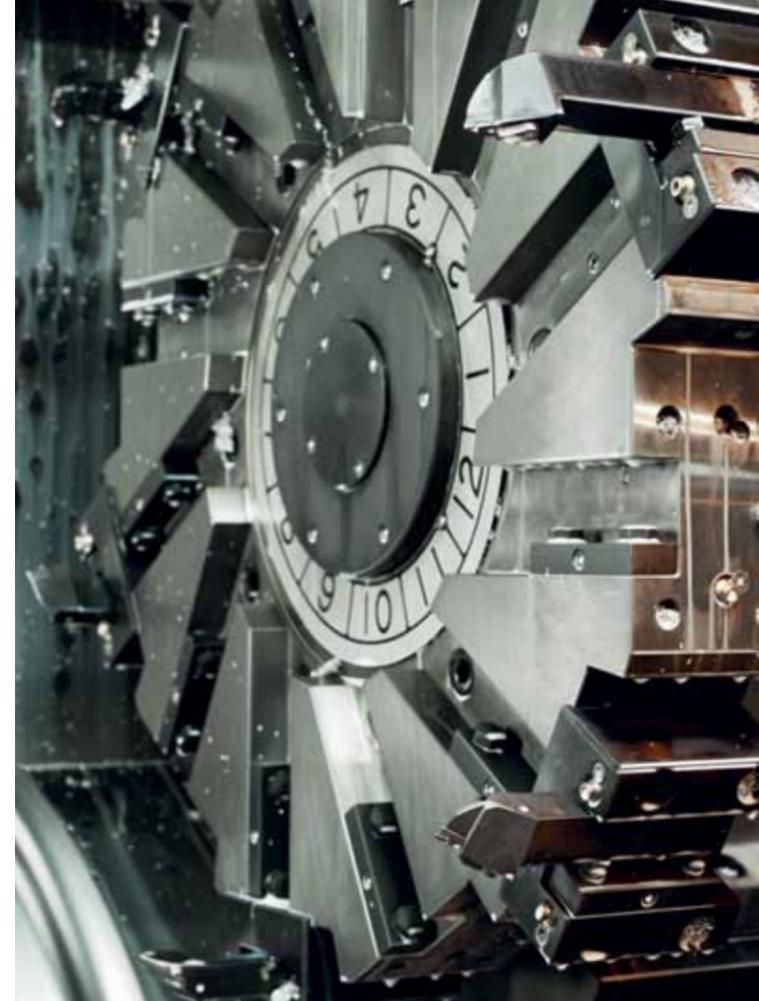
Above and right: Wheels are transported along the production line.





**TO BE FORGED SUCCESSFULLY, ALUMINUM WHEELS MUST UNDERGO A NUMBER OF RELATED PROCESSES - HEATING, PRESSING, SPINNING, STRETCHING, AND COOLING - THAT RETAIN THE METAL'S STRENGTH AND LIGHTNESS**

Clockwise from top left: The oil that keeps the aluminum from sticking to the metal when pressed is cooled; a wheel is spun and stretched into place; a diamond cutter shaves the surface of a wheel; detail of a wheel; another detail; a wheel being washed; a stack of finished pieces.



**“IT’S REWARDING TO SEE THAT THE THINGS WE PRODUCE IN THIS CITY MAKE THEIR WAY ONTO THE WORLD’S MOST DESIRABLE AND EXOTIC AUTOMOBILES”**

Right: Craftspeople check the quality of almost-finished wheels. It takes a month of training to become a final inspector.



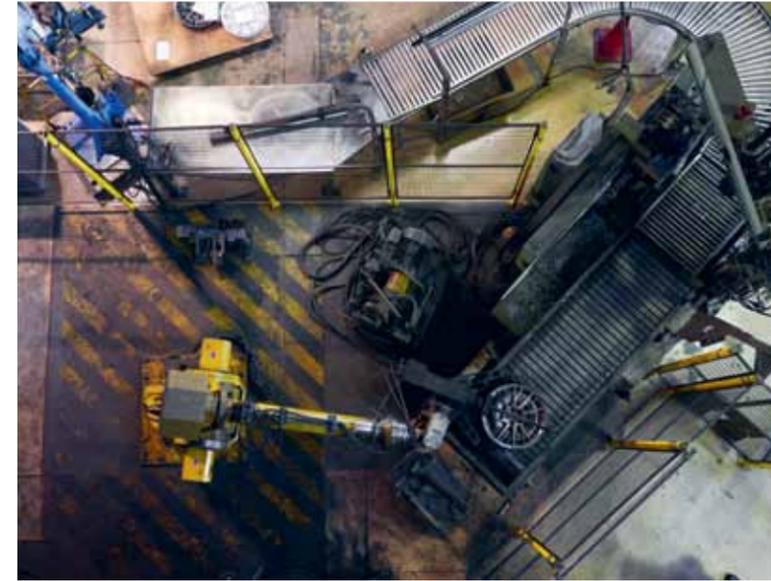
Above: Masato Sawada, head factory manager of BBS Japan Co. Ltd., stands in front of finished wheels at the large Takaoka plant.

At the Takaoka plant, craftspeople are running through the motions of making a one-piece Lexus wheel. A round piece of aluminum billet is heated to about 480 degrees Celsius (896 degrees Fahrenheit) and placed into a large hydraulic press, as tall, it seems, as a three-story office building. The machine drops 9,000 metric tons of pressure onto the billet, pressing the aluminum into a mold. This process is repeated twice more until the face and inside of the wheel takes shape. Then, automated machines transfer the object to another part of the facility, where it undergoes the “spinning” process. It’s here that the outer portion of the aluminum cylinder is physically pulled into shape.

“When aluminum is subjected to the intense pressure from the hydraulic press,” Sawada explains, “its molecules become more pliable. This holds true for nearly all metals, including magnesium, which we also use to forge wheels.”

After roughly four to six minutes on the spinning machine, the once cylindrical billet now more closely resembles a wheel, which then undergoes a heating and cooling process to allow the molecules in the metal to bond, followed by a cleaning/deoxidation process. A final inspection takes place under careful human supervision. Here, the wheels are subjected to a process called shot peening, which adds a compressive residual stress layer to the metal by blasting it with metallic sand.

“Although the training period for an inspector is one month,” says Kazuhiro Oshima, a member of the team responsible for shot peening and close inspection, “it takes about a year before he or she can recognize the smallest flaws, as well as be able to sand the surface of the wheel to a perfect finish.” Oshima checks the wheels regularly: “One wheel takes me about 15 minutes to inspect, but for someone fairly new to the job it can take up to an hour. That’s how meticulous the process is.”



For wheels on the Lexus IS F, RCF, and LSF Sport, there are additional steps in the manufacturing process. The general manager of the OEM Sales Department, Akihisa Miyoshi, explains how “after these wheels are painted, they undergo either a partial buffing or diamond cutting process.” The partial buffing process is executed by an outside specialist, he says, who buffs part of the spoke “to create a samurai sword-like shape and finish to the metal. This is an expensive procedure reserved for our finest wheels. The diamond-cutting procedure, which is performed at our Oyabe plant, about ten kilometers away, consists of the spokes and rims being shaved by a specialized cutter with diamond blades to produce a smooth, clean metallic surface with sharp edges.”

As another day for Sawada draws to a close, he welcomes workers on the evening shift as he prepares to leave. The Takaoka facility operates 24 hours a day, from Monday to Friday, with three

separate shifts. It churns out 600 wheels per day, about 12,000 per month, or roughly 144,000 a year. Sawada says that the pressure of producing these high-quality products in such quantities takes a tremendous toll – it’s hard work, detailed and precise – but the 26-year veteran of the Takaoka plant wouldn’t have it any other way.

“I love cars, and I love Takaoka,” Sawada says, “so I want to make sure that each wheel is perfect, and all of our customers, as well as our employees, are happy. As a local, it’s rewarding to see that the things we produce in this city make their way onto the world’s most desirable and exotic automobiles. As a Takaoka native, this is something I take a high level of pride in.” ☺

Above: Inspectors stand at individual booths to check quality one more time before the wheels are distributed around the world. Top: Finished Lexus wheels sit stacked at the Takaoka plant.

LEXUS

## AT WORK WITH JAMES ROSSITER

*Lexus driver James Rossiter explains the importance of teamwork  
in his race for victory*

Text by Sarah Fournier and photography by Eric Micotto





**"RACING IS THE ONLY THING I EVER WANTED TO DO. IT'S IMPRINTED IN MY DNA"**

"Racing is the only thing I ever wanted to do," says professional racing driver James Rossiter. "It's imprinted in my DNA." The 31-year-old Englishman, who joined Lexus' Super GT Team in 2012, began visiting circuits as a child – before his feet could even touch the pedals. His father was a driver, and the Rossiter family followed him to races around the world. "My father actually didn't want me to get into the business," Rossiter says. "He understood the challenges associated with the profession, but I've had this spurring passion for as long as I can remember. And this is the key to becoming a racing driver."

"It all happened very quickly," Rossiter recalls when asked about the moment he joined the Lexus team. "One of my friends was moving on, and he believed I would be good to replace him." Rossiter was brought in to do a test, and the next thing he knew he had a contract. "Becoming a driver for Lexus depends on your performance but also on your spirit," he says. "You have to be the right fit for Lexus and the team."

Rossiter's first line of duty as a Lexus driver is his performance on the track. But his job incorporates a variety of other roles, not least as the linchpin of a close collaborative team whose members are all striving for pole position. In testing he works closely with Lexus engineers on the tuning and amelioration of his car, the new Lexus RC F GT500, providing feedback and direction for future improvements.

"The key to success in motorsport is the relationship between drivers and engineers: we let our engineers know exactly what we need as drivers to achieve ultimate performance," explains Rossiter, who worked closely with the Lexus team to develop his car's aerodynamics. "Aerodynamics are very important to the speed of the car and its balance through corners. The changes we make can seem small, but when you're taking turns at 160 kilometers per hour, they make a huge difference." Rossiter's role doesn't stop at the finish line. The work behind the scenes is what makes a strong



Opposite top: Rossiter, in the RC F GT500, focuses on laps ahead. Opposite bottom: Team mechanics refine the car during a brief stop. Above: Rossiter debriefs with one of his engineers.

team, he says, and allows the driver and the car to reach the extreme level of performance required to challenge in a competition like the Super GT.

"I remember a moment last month," Rossiter says. "My teammate got into a small accident with the car, and the engineers worked all night, until 5 a.m., to repair it. Because of their changes, the next day we were even faster during testing. It's really about the whole team; the driver is one small part of it. I depend on the team. And I need them to believe in me when I'm out on the circuit."

Rossiter visits the Lexus workshops a few times a year. It provides him with the opportunity to keep abreast of the improvements and updates made to the car, follow up on ideas and conversations, and spend time with the close-knit team. Those visits are "occasions to all go out for dinner and have a fun time," Rossiter says. "We move through everything together, every high and every low. I may be the one in the car, but I would be nothing without my mechanics."

Rossiter's passion for driving – and for Lexus' cars – doesn't stop at racing. He believes that his expertise with race cars can be translated and applied to road cars. Rossiter wants to continue working with engineers to help improve the conception, development, and testing of future Lexus road cars. For Rossiter, solid collaboration between the driver and the engineers is the key to market-leading innovation and performance in the industry. ◉

**TESTING DAY**

A typical Lexus testing day is long and hard, filled as much with high-speed driving as with in-depth analysis. While Rossiter runs laps – two sessions: one in the morning, one in the afternoon – a team of engineers monitors his progress, periodically tweaking the car and adapting race strategies. For Rossiter, the experience is exhausting but rewarding. "Life as a Lexus driver is intense," he says.

07:45

Rossiter gets the blood flowing with push-ups and squats, then grabs breakfast, with plenty of coffee.



13:20

Rossiter gets back to the pit for a quick power nap in the team truck – a last shot of energy and a chance to reset.



08:45

The team meets on the racetrack for a quick briefing to set the day's goals. It is an important time for the drivers to get detailed direction from their engineers.



13:50

Coffee break.



09:40

Rossiter jumps into the car for the first session of testing. For two hours the race drivers and the engineers will run through a packed program, checking engine updates.



14:00

Rossiter is back on track. The team members focus on different areas for the second part of the day. Rossiter will concentrate on race simulations to evaluate and record the car's performance over a longer spin. He and the car have to perform constantly over a draining 45-lap run.



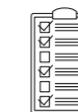
11:40

Debriefing with the engineers. Rossiter must give precise and thorough feedback so that his comments can be compared with information gathered by the car's numerous data loggers.



16:00

Debriefing. The team regroups to go over each second of the day. Did they achieve what they wanted? What can they work on? Rossiter and the engineers discuss and summarize the day's results, and discuss different possible strategies for the race, such as scheduling critical pit windows. At the end of the catch-up, new goals are set for the upcoming days of testing.



12:15

Rossiter and his teammates sit down for a quick lunch while the mechanics make adjustments to the car based on the results of the morning's session.



18:00

Exhaustion hits. Rossiter heads back to his hotel. Time to unwind and regroup.



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