

WONDER WOOD



Barbara Glasner, Stephan Ott

# **WONDER WOOD**

*A FAVORITE MATERIAL FOR DESIGN, ARCHITECTURE AND ART*

Birkhäuser  
Basel

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# MATERIAL AND TECHNOLOGY GUIDE

ELEMENTARY PRINCIPLES AND INNOVATIVE DEVELOPMENTS IN THE AREAS OF WOOD AND WOOD-BASED MATERIALS, PRODUCTION PROCESSES, AND CONSTRUCTION PRINCIPLES IN TIMBER BUILDING

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# IN THE WONDERLAND OF WOOD

*"FOREST, TIMBER FOREST, TREE FELLING, AS IT HAS ALWAYS BEEN."*

THOMAS BERNHARD, *HOLZFÄLLEN. EINE ERREGUNG* (CUTTING TIMBER. AN IRRITATION), 1984

1 SEE HANS-JÖRG MODLMAYR, *SPEERSPITZE DER ARCHÄOLOGIE – DIE ERFORSCHUNG DER HOLZ-ZEIT* (SPEAR THROWER OF ARCHEOLOGY—RESEARCHING THE WOOD AGE. TRANSCRIPT OF A RADIO BROADCAST, DEUTSCHLANDRADIO KULTUR—FORSCHUNG UND GESELLSCHAFT), AUGUST 27, 2009.

2 [WWW.UN.ORG/EN/EVENTS/IYOF2011/RESOLUTION.SHTML](http://WWW.UN.ORG/EN/EVENTS/IYOF2011/RESOLUTION.SHTML)  
ACCESSED JUNE 28, 2011.

3 SEE ALSO BURKHARD MÜLLER, "DIE SCHÖNHEIT DES WALDBAUS. DIE FORSTAKADEMIE THARANDT FEIERT IHREN ZWEIHUNDERTSTEN GEBURTSTAG — UND DIE ENTDECKUNG DER NACHHALTIGKEIT" (THE BEAUTY OF THE FOREST. THE THARANDT FORESTRY ACADEMY CELEBRATES ITS 200TH BIRTHDAY—AND THE DISCOVERY OF SUSTAINABILITY). IN: *SÜDDEUTSCHE ZEITUNG* NO. 140, P. 9, JUNE 20, 2011.

4 SEE STEFFEN UHLMANN, "LUXUSYACHTEN STATT SCHRANKWÄNDE. DER TRADITIONSREICHE MÖBELHERSTELLER DEUTSCHE WERKSTÄTTEN HELLERAU MUSSTE SICH NEU ERFINDEN, UM IN DER HART UMKÄMPFTEN BRANCHE ZU ÜBERLEBEN" (LUXURY YACHTS INSTEAD OF WALL UNITS. THE FURNITURE MANUFACTURER DEUTSCHE WERKSTÄTTEN HELLERAU, RICH-IN-TRADITION, NEEDS TO REINVENT ITSELF TO STAY AHEAD OF THE GAME IN THE HIGHLY COMPETITIVE BRANCH OF FURNITURE MAKING). IN: *SÜDDEUTSCHE ZEITUNG* NO. 14, P. 21, JANUARY 19, 2011.

5 CHRISTOPH SCHINDLER, *EIN ARCHITEKTONISCHES PERIODISIERUNGSMODELL ANHAND FERTIGUNGSTECHNISCHER KRITERIEN, DARGESTELLT AM BEISPIEL EINES HOLZBAUS* (AN ARCHITECTURAL PERIODIZATION MODEL USING PRODUCTION TECHNIQUE CRITERIA, ILLUSTRATED WITH AN EXAMPLE OF A WOODEN STRUCTURE), PH.D. DISSERTATION, ZÜRICH, 2009.

**First and foremost, the most fascinating and wonderful fact: Wood is irreplaceable, but it grows back.**

This fact alone makes wood a unique and sustainable material. It may also be the reason why many disciplines continue to use wood, and also why it has continued to accompany us through the ages. Archeologists now speak of the Wood Age as an enduring historical age of mankind. The Stone or Bronze Ages, for example, would not have been possible without the existence of wood or its application as a building or heating material. New findings show that even the Neanderthals had discovered how to fix a flint blade into a wooden handle by using heated birch-bark tar.<sup>1</sup>

**Woods and Forest. The Raw Material**

2011 was named the International Year of Forests by the United Nations. Which is ultimately unnerving, because whenever something has a year dedicated to it, it usually means that it is in need of attention, care, and that we need to be reminded of its value. However, UN Resolution 61/193 reassures us that forests are given great importance as climate protection and providers of a vital, perhaps even the most important raw material in the world.<sup>2</sup> Because, different to other raw materials such as oil, coal, or ore, wood grows back in a reasonable amount of time, remaining consistent in quality. In Germany and in Switzerland, forests comprise approximately thirty percent of their national area, in Austria, they comprise as much as forty-eight percent. This percentage remains stable due to efforts by forest management, which was established two hundred years ago in Germany.<sup>3</sup> Without the intensive commitment and research of this discipline—despite some rather damaging forest management aberrations such as the planting of monocultures and clearcutting—the outlook for forests would be much more dire, and the same would be true for wood as a construction material and for by-products manufactured from wood. An additional, important contribution is the increasing requirement to certify wood products with labels such as PEFC (Programme for the Endorsement of Forest Certification Systems) and FSC (Forest Stewardship Council).

**More than Wood. The Construction Material**

Wood is a multifunctional material that is particularly exciting because it can be used in more areas and in more forms—from roughly sawn construction wood to oiled parquet flooring and luxurious furniture—than any other material. Moreover, because it is also available regionally—which is an additional valuable advantage over other raw materials—people from all over the world have been building with wood for thousands and thousands of years. It was therefore logical that the material was developed from a raw material into a construction material: the specific modification, meaning that wood began to be industrialized at the latest in the nineteenth century, with the steam bending process invented by Michael Thonet, was continued at the beginning of the twentieth century with the invention of the laminated wood panel by furniture maker Karl Schmidt, co-founder of the German Hellerau Workshops, and artist, graphic designer, and interior architect Johannes Joseph Vincenz Cissarz.<sup>4</sup> There are more and more new wood construction materials being developed today, and wood is capable of ever more innovative possibilities that were previously ascribed to other materials: today, for example, it is possible to injection mold plastic in the form of Wood Plastic Composites (WPC). In structural timber engineering, modern wood plastics are now a standard in many fields alongside concrete and steel (construction, fire prevention, and so on). In some cases they are even preferred. There are a number of research institutes focused on developing new ways of modifying wood, and based on the knowledge we have today, we can assume that one of the most important construction materials of the past will be one of the most important of the future.

**Old Connections and New Technology. The Resource Material**

Wood not only grows back and is CO<sub>2</sub> neutral, it can also be recycled 100 percent into the ecological cycle—without downcycling or producing non-biodegradable residual waste. It is one of the few technical construction materials that truly holds to the cradle-to-cradle principle, meaning it can qualify as a resource material.

Because it is extraordinarily adaptable, wood is also an excellent basic material for new technical developments. A current example of this are the most recent CNC processing centers. “The steel joint initially superseded the wood-to-wood joint because it was not sufficiently cost-effective. But now, CNC technology is helping the wood-to-wood joint regain its territory as a cost-effective alternative.”<sup>5</sup> That’s why wood qualifies as a valuable technological material for the twenty-first century.

**Felled, Comforting. The Vital Material**

Wood is created when a tree grows. However, when we speak of wood, we are usually referring to the dead material. In German, the word *Holz* (wood) is derived from the Old High German word “felled.” Nonetheless, this felled material has more life in it than plastic. Even long after it has been felled, wood continues to expand and contract, it ages with dignity, it warms, is insulated, has a pleasant scent, and it gives us advance warning by making creaking sounds before it breaks. They even say that Swiss pine has a heartbeat-slowing effect and is supposed to calm and soothe—a quality greatly appreciated by many innkeepers in the Alps region, who traditionally panel their pubs with Swiss pine. There are even political decision makers who take advantage of the calming effect of this wood. The top floor of the Bavarian State Chancellery is paneled with Swiss pine.

**WonderWood. The Reading Material**

This book is a compilation of over a hundred current projects and “making-of’s,” from the fields of design, architecture, and art, that work with wood as a material in varied and extraordinary ways. We also had the opportunity to interview thirteen internationally acclaimed designers, architects, and artists about their work(s). The discussions illustrate in detail the different approaches used by the three disciplines, but also reveal the designers’ and artists’ enthusiasm for the diverse material and the intense ways of working with the material.

Readers who would like to research the subject further can look at the material and technological guide in the second part of the book. This section is designed as a reference handbook, providing a glimpse of the complex world of wood and its manufacturing processes, as well as tips on constructing with wood.

Those who would like to research even further can refer to the final service section, where you will find information about further literature, essays, magazines, and websites that specialize in the subject.

We will continue to be committed to the subject of wood in the future, because we’re convinced that we’re in store for many more surprises from this raw, construction, resource, and vital material:

[www.wonder-wood.de](http://www.wonder-wood.de)

Barbara Glasner and Stephan Ott





# ***PROJECTS AND PROCESSES***

CONTEMPORARY PROJECTS, PRODUCTS, EXPERIMENTS, MAKING-OFs, AND  
NEW DIMENSIONS FOR WOOD IN DESIGN, ARCHITECTURE, AND ART



# 24H > ARCHITECTURE

DRAGSPELHUSET (ACCORDION HOUSE), 2009  
ÖVRE GLA, SWEDEN  
SHINGLES OF WESTERN RED CEDAR  
FOOTPRINT: 54-72 M<sup>2</sup>



The organic structure of this house is ideally adapted to its natural forest setting. A section of the house is mounted on castors, allowing it to be slid in and out like a drawer. The roofing shingles, a traditional material used for roofs in Sweden, are made from Western Red Cedar, a wood that requires no further maintenance.



# WERNER AISSLINGER

**HEMP CHAIR, 2012**  
 STACKABLE CHAIR  
 HEMP, KENAF (MALVACEAE FAMILY), WATER-BASED  
 THERMOSET BINDER ACRODUR® BASF  
 DEPTH 50 x WIDTH 65 x HEIGHT 75 CM, WEIGHT: 15 KG  
 MANUFACTURER: MOROSO



The Hemp Chair belongs to the tradition of stackable, manufactured monobloc chairs, usually made of reinforced plastics such as polypropylene. Unlike these, however, it is made exclusively from the natural fibers hemp and Malvaceae kenaf. The fibers are formed by heat treatment, and bonded using Acrodur®,



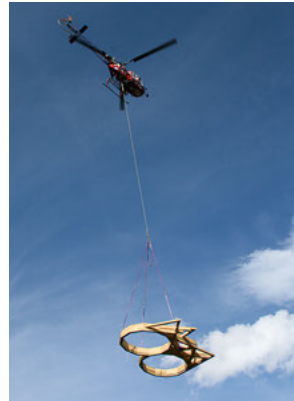
a formaldehyde-free, water-based thermoset binder. The manufacturing process, which was borrowed from the automotive industry, gives the Hemp Chair an extraordinary high stability and low weight.

# ALICE

(ATELIER DE LA CONCEPTION DE L'ESPACE)

STUDENTS AT THE ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE (ALICE 2009: AHMED BELKHODJA, AUGUSTIN CLEMENT, NICOLAS FEIHL, OLIVIER DI GIAMBATTISTA, EVELINE JOB, MARTIN LEPOUTRE, SAMUEL MAIRE, BENJAMIN MELLY, ADRIAN LLEWELYN MEREDITH, FRANÇOIS NANTERMED); PROFESSOR: DIETER DIETZ, ZÜRICH; TEAM: KATIA RITZ, DANIEL POKORA, OLIVIER OTTEVAERE, ALINE DUBACH, ISABELLA PASQUALINI, EVELINE GALATIS.

**EVOLVER**, 2009  
STELLISEE, ZERMATT, SWITZERLAND  
SPRUCE  
Ø 8.8 M, HEIGHT 5 M







The walk-in sculpture was originally conceived as a temporary installation for the 2009 Zermatt Festival of Chamber Music. For this reason, it was to be a relatively low-tech construction that could be easily installed and then dismantled at the end of the festival. "Evolver"

references the panoramic view from Zermatt of the Matterhorn and the Monte Rosa Massif. The sculpture consists of twenty-four, spiral-shaped wooden frames, that open toward a 720° panorama of extraordinary perspectives.

# ARCHITEKTEN MARTENSON UND NAGEL-THEISSEN

**JUST K**, 2009  
TÜBINGEN, GERMANY  
DWELLING HOUSE  
INTERNAL AND EXTERNAL WALLS OF SPRUCE  
AND CROSS-LAMINATED PINE, TIMBER  
FLOORS OF SILVER FIR  
FLOOR AREA: 138 M<sup>2</sup>



This building constructed of solid timber elements was prefabricated in modules, assembled on site, and completely covered with a roof foil of synthetic rubber. The house consists of a total of 136 individual elements. Before being assembled, rebates were made in them for

the joinery and carpentry work, and channels and holes bored for the electrical services. The interior fitting out including furniture and stairs is integrated in the architecture, the wood for these was sanded, leached, and soaped to preserve its light color.













# YEMI AWOSILE

**CORK FABRIC, 2008**  
FURNITURE UPHOLSTERED WITH CORK AND  
POLYMER FIBER  
STOOL: Ø 40 CM, HEIGHT 30 CM  
PROTOTYPES



This extremely lightweight fabric is a mixture of shelled, treated cork and an elastic polymer fiber (elastic). It is an extraordinary fabric above all because of its excellent thermal and acoustic insulation qualities. Its elasticity and flexibility make the fabric perfect for a variety of interior uses, such as wall-coverings or upholstery.

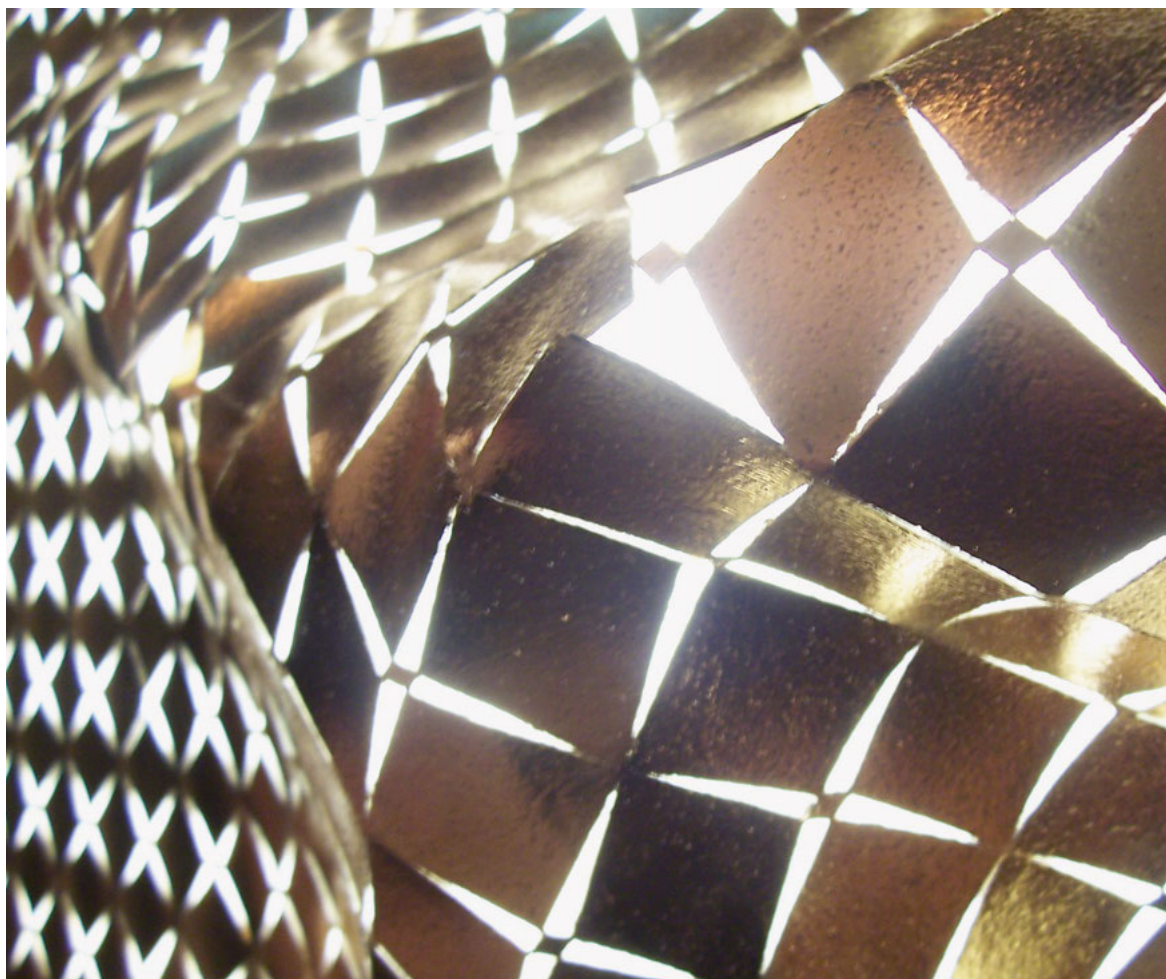








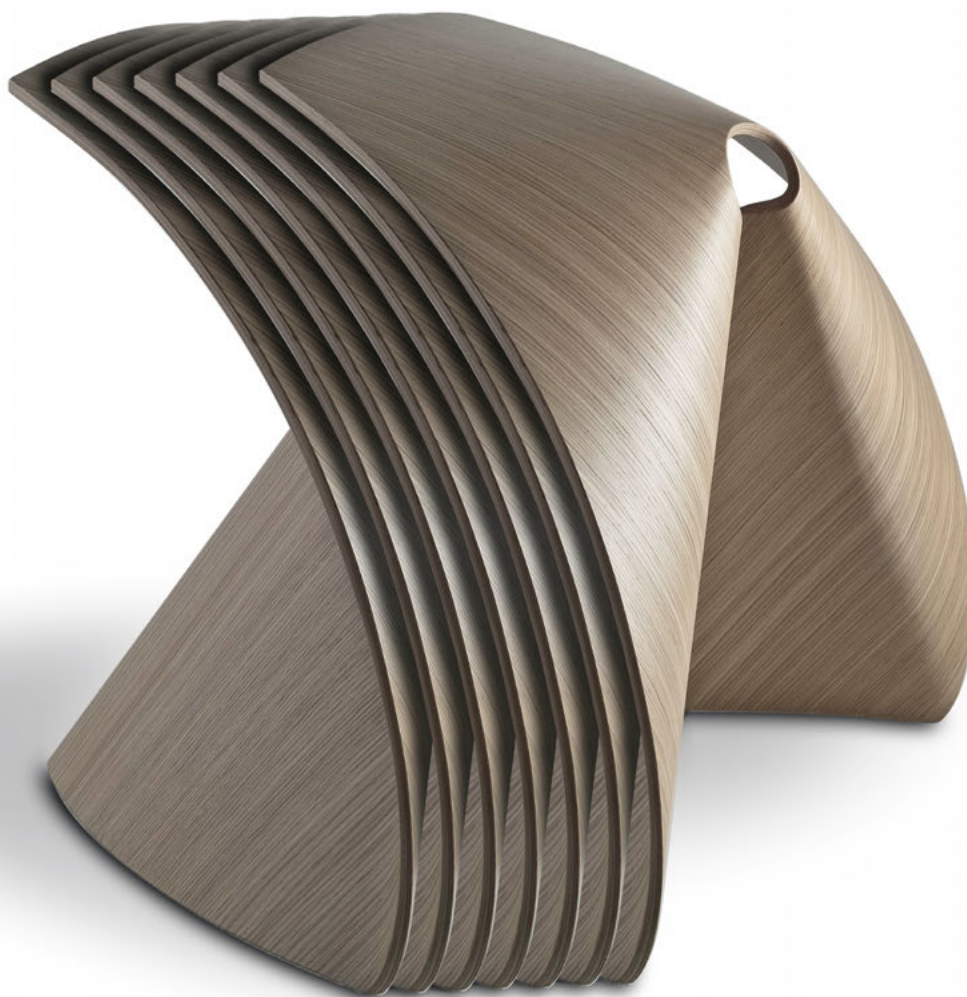




The cork mats are a by-product of wine cork production and are suitable for use in interiors as wall paneling or room dividers. The laser-cut mats are available in a wide variety of sizes and shapes and can be coated in different metallic varnishes, such as silver, copper, or gold.

# SHIN AZUMI

AP, 2010  
STACKABLE STOOLS  
MULTIPLEX (OAK, BLEACHED OR BLACK  
STAINED)  
DEPTH 37 x WIDTH 47 x HEIGHT 50 CM  
MANUFACTURER: LAPALMA



The stackable stool is a monocoque construction made from a piece of plywood, with no joining bolts or screws. Its form is derived from origami, follows ergonomic requirements, and is also highly stable.



# MAARTEN BAAS

**CHINESE OBJECTS OBJECT**, 2008  
CARVED CAMPHORWOOD, VARNISH  
DEPTH 120 x WIDTH 120 x HEIGHT 195 CM  
CREATED DURING THE CONTRASTS GALLERY  
"ARTIST IN RESIDENCE" PROGRAM  
COURTESY CONTRASTS GALLERY, SHANGHAI



Within the framework of the Artist in Residence program, Western designers were given the opportunity to engage with local cultural traditions and artistic processes in Shanghai. The assemblage of different Chinese wooden objects was carved from solid wood by Chinese artisans.



The design classics in the “Smoke” collection were first burned with a gas burner and then coated with epoxy resin. This preserves the pitch-black burnt wood. The concept is based on Maarten Baas’ final thesis work at the Design Academy Eindhoven from 2003.

**SMOKE**, 2004-2009  
BURNED FURNITURE DESIGN CLASSICS WITH  
AN EPOXY COATING AND TRANSPARENT  
POLYURETHANE AND UV-FILTER,  
COURTESY MOSS, NEW YORK

**"WOODEN CHAIR"**  
BY MARC NEWSON, 1992  
DEPTH 74.9 x WIDTH 74.9 x HEIGHT 99.7 CM

**"RED AND BLUE CHAIR"**  
BY GERRIT T. RIETVELD, 1918  
DEPTH 88 x WIDTH 66 x HEIGHT 83 CM

**"FAVELA CHAIR"**  
BY FERNANDO AND HUMBERTO  
CAMPANA, 2003  
DEPTH 61 x WIDTH 67 x HEIGHT 74 CM

**"ZIG ZAG CHAIR"**  
BY GERRIT T. RIETVELD, 1934  
DEPTH 42 x WIDTH 38 x HEIGHT 75 CM





# BERNARDO BADER

.EMA HAUS, 2008  
FELDKIRCH-NOFELS, AUSTRIA  
FACADE OF ROUGH SAWN FIR  
FOOTPRINT: 57 M<sup>2</sup>, FLOOR AREA: 90 M<sup>2</sup>



The rear-ventilated facade of this three-storey house consists of rough-sawn fir wood boards that can be fitted when still moist, thanks to a vertical tongue and groove joint. The prefabricated wooden substructure meant that the entire assembly, including the fitting-out of the interior with birch plywood paneling, could be completed in a day and a half—allowing the building costs to be substantially reduced.





# ALDO BAKKER



Each of the stools consists of one leg, a curved base, and a top seat that are constructed from eight layers of the same piece of wood, a process that protects the wood from splitting. The "Urushi Stool" is made from different pieces of wood and is an intricately crafted construction. It is treated with 30 individually sanded layers of Urushi

**STOOL, 2009**  
COLLECTION OF STOOLS MADE FROM RECYCLED WOOD  
STOOL: HONEY LOCUST (*GLEDTISIA TRIACANTHOS*), ELM, ASH OR BEECH, TRANSPARENT VARNISH  
DEPTH 35 x WIDTH 36 x HEIGHT 34 CM  
PRODUCTION: KUPERUS & GARDENIER  
LIMITED EDITION OF 15 PIECES

**STOOL URUSHI, 2006**  
STOOL COLLECTION OF ABACHI WOOD  
URUSHI LACQUERER: MARIKO NISHIDE  
LACQUER SUPPLIER: TAKUO MATSUZAWA, JOBOJI URUSHI SANGYO  
DEPTH 36 x WIDTH 36 x HEIGHT 34 CM  
LIMITED EDITION OF 7 PIECES  
CLIENT: PARTICLES GALLERY



varnish, a traditional Japanese varnish made from resin derived from the lacquer tree (*Rhus vernicifera*). The varnish is highly durable; 9,000-year-old, well-preserved examples exist of objects painted using the Urushi method.