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Animal Dwelling Modules

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GLOBALIZING ARCHITECTURE / FLOWS AND DISRUPTIONS

102ND ACSA ANNUAL MEETING

John Stuart + Mabel Wilson

PROJECT PROCEEDINGS

Animal Dwelling Modules

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While it would be hubris to think that humans could design habitation for other creatures that surpass those they produce for themselves, the intention of this design inquiry was to humbly pursue multiple pedagogical objectives. First, by deeply exploring the geometries, materials, and methods of other creatures' habitats, students translated these lessons to similar generators of architectural space and form designed for humans. Additionally, as they explored the practical and poetic expression of materials and construction in a cross-species repertoire of architectural outcomes, students were able to get outside of the derivative architectural forms that haunt many studio projects.

The bats, bees, birds, chickens, ducks, tilapia, oysters, guinea pigs, rabbits and silk worms represented in projects had unusual programmatic needs, largely unfamiliar to these beginning design students. Unlike the typical design studio where students might project their own ideas about architectural space to a more universal building type, these unusual clients forced the students to think beyond themselves and their notions of housing. They were encouraged to consider, for instance, the unique needs of their animal clients, the typical forms and geometries that these animals use to construct their own dwellings, appropriate materials, and the ways in which humans interface with these species. Students developed a tectonic structure by referencing the additive, subtractive, and secretive construction methods found in nature.

Through this 2-week process, students discovered many advantages inherent to animal architecture that a typical studio project might otherwise lack. Their solutions sought to repair or remediate environmental conditions, address habitat loss, resolve construction issues through detailing and materiality, and educate humans about their animal client. In doing so, students shed the preconceived notions that might accompany the design for a human client, instead intensely investigating geometries, morphologies, materials, and methods to create a module for animal living.

FLIGHT
Hummingbirds are the only birds in the world that can hover, fly backwards and even upside down. This is due to the ball and socket joint of their wings. They move their wings in a figure eight motions to achieve their range of movement.

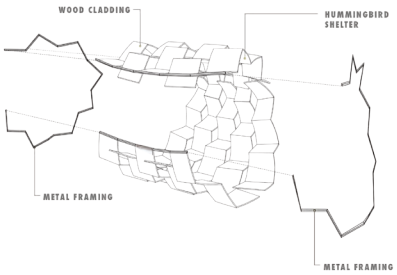
WINGS
A hummingbird's wings can beat 12 to 80 times per second. Their heart beats 1,960 beats per minute. Their name comes from the humming noises their wings make from beating so fast.

EATING HABITS
Hummingbirds eat often due to their fast metabolism. 5 to 8 times an hour for 30 to 60 seconds at a time. Favorite foods include flower nectar, tree sap, insects or pollen. Their tongues are long and narrow to access nectar from narrow flowers.

MATING
Hummingbirds do not mate for life; males usually do not help raise the young. Females lay 1 to 3 eggs. The babies can be smaller than a penny. They remain in the nest for 3 weeks, in which time they cannot fly.

SIZE
Females are typically larger than males. A hummingbird's brain takes up 4.2% of its body weight, the largest proportion in the animal kingdom. The smallest bird in the world, the Bee Hummingbird, is found only in Cuba. It is 2.25 inches long.

TORPOR
To conserve energy when sleeping or when food is scarce, hummingbirds enter a hibernation-like state. Their metabolism slows to 1/15 its normal rate, their heart rate reduces from 500 beats per min. to 50, and their temperature lowers 20 degrees.



BAT DIET
Depending on the type, bats can eat fruit, nectar and even small frogs and fish. While there are blood sucking bats, bats generally eat insects. Bats are natural pest controls: a single brown bat can catch 1,200 mosquito-size insects per hour.

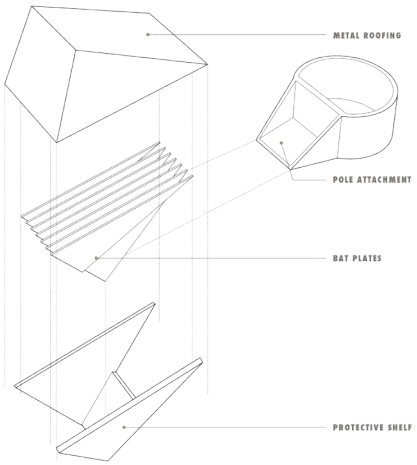
FLYING MAMMALS
Bats are the only flying mammals in our planet. With their thin wings, they possess extreme aerodynamic skills. Like other mammals, bats grow hair, give birth to their young, have milk glands, and produce milk to feed their kids.

SIZE
The majority of bats average 3 5/8- 3 3/4 inches in height. Their wingspan typically is 11 inches. The wingspan of the biggest known bat is about six feet, while the body of the smallest bat can only take up about an inch.

LIFESPAN
Bats tend to live longer than other mammals their size. The longest known lifespan is 30 years for the small brown bat. Female bats reproduce at a rate of one offspring per year, although some species produce 3 - 4 offspring at a time.

HIBERNATION
During cold winter months bats either migrate to a southern region or hibernate. During hibernation, bats huddle up in clusters in a secure location from predators such as a hollow tree or empty attic.

WHITE NOSE
Many bats are suffering from white nose syndrome. This white fungus growing on their noses, causes bats to wake up from hibernation early and freeze to death. Eleven bat types are affected by this syndrome, five of which are endangered.



QUEEN BEE
The queen bee is the most important bee in the hive. She is the only female bee that reproduces, generating roughly 600 -500 eggs each day. A bee reaches queen status by consuming "royal jelly"--a protein secreted from worker bees.

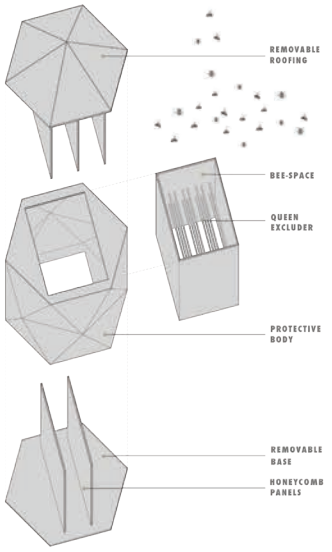
HONEY
Worker bees suck up nectar and water and store it in a special honey stomach. When the stomach is full the bee returns to the hive and puts the nectar in an empty honeycomb. A beehive can generate up to 400 pounds of honey per year.

WORKER BEE
The worker bees make up the vast majority of the hive's population and are all non-reproducing females. The workers find food and protect the hive. A worker bee gathers only 1/10 teaspoon of honey in her entire life.

ANATOMY
Bees go through four stages of development: Egg, Larvae, Pupae and Adult Bee. They have two stomachs: one for eating and the other for storing nectar collected from flowers or water. Bees have 5 eyes, but cannot see the color red.

HONEYCOMB
Beeswax is produced from glands on the worker bee's abdomens when they are 12 to 15 days old. The bees use their mouths to shape the beeswax into hexagonally shaped honeycomb. This shape requires less wax and holds the most honey.

THE HIVE
Man-made hives provide an enclosure for bees to build their honeycomb cells. Bees maintain an interior nest temperature of 92-93 degrees. A populous colony contains 40,000-60,000 bees in the late spring/early summer.



PREDATORS
Chickens have a wide range of predator including coyotes, foxes, hawks, dogs, cats, racoons, and skunks. Depending on where the chickens are being raised the coop must be predator-proof to ensure their safety.

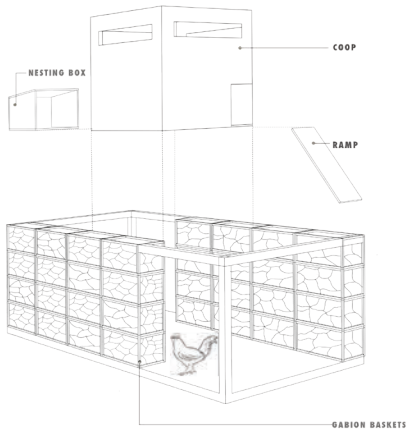
DISEASE
Chickens are prone to numerous diseases. The main disease is respiratory. Chickens need breeze in the summer, and a coop that is not drafty in the winter.

ROOSTING
Female chickens love to sleep high up on roosting poles. Chickens need only five to ten inches of space per bird. A roosting pole is usually a round peg of wood that is two inches thick.

EGG LAYING
Female chickens or hens have an instinct to to lay their eggs in a safe, dark, out of the way place. It is important that chickens are provided with a nesting box.

FOOD
Chickens need food and water available at all times. They need to be provided with a feeder and waterer, and ideally need to be six inches off the ground. Chickens eat chicken feed, different vegetables, and numerous forms of calcium.

SOCIALITY
Chickens are highly social creatures. They spend the vast majority of their time with their with other chickens. It is important that there is a minimum of two chickens per coop.



ANIMAL DWELLING MODULE

A design research project that explores the practical and poetic expression of materials and construction for cross-species cohabitation

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Design Research in the Studio Context