



## About Our Cover

The great egret (*Ardea alba*), also known as the "great white egret," "common egret," or (now not in use) "great white heron" is a large, widely distributed egret distributed across most of the tropical and warmer temperate regions of the world and in southern Europe, where it is rather localized. In North America it is more widely distributed, and it is ubiquitous across the Sun Belt of the United States and in the rainforests of South America. In Florida it is sometimes confused with the great white heron, which is a white morph of the closely related great blue heron (*A. herodias*). It is in the order Pelecaniformes and family Ardeidae.

The great egret is a large bird with all-white plumage that can reach 1 m in height, weighs up to 950 g (2.1 lb), and has a wing span of 165–215 cm (65–85 inches). Apart from size, the great egret can be distinguished from other white egrets by its yellow bill and black legs and feet. In breeding plumage, delicate ornamental feathers are borne on the back. Males and females are identical in appearance; juveniles look like nonbreeding adults. It is a common species, usually easily seen. It has a slow flight, with its neck retracted. This is characteristic of herons and bitterns and distinguishes them from storks, cranes, ibises, and spoonbills, which extend their necks in flight. The great egret is not normally a vocal bird; at breeding colonies, however, it often gives a loud croaking *cuk cuk cuk*.

The great egret is partially migratory, with Northern Hemisphere birds moving south from areas with colder winters. It breeds in colonies in trees close to large lakes with reed beds or other extensive wetlands. It builds a bulky stick nest. In 1953 the great egret in flight was chosen as the symbol of the National Audubon Society, which was formed in part to prevent the killing of birds for their feathers.

The great egret feeds in shallow water or drier habitats, mainly on fish, frogs, small mammals, and occasionally small reptiles and insects, spearing them with its long, sharp bill most of the time by standing still and allowing the prey to come within striking distance of its bill, which it uses as a spear. It will often wait motionless for prey or slowly stalk its victim.

Though it might appear that great egrets feed on the parasites of African buffaloes, they actually feed on leafhoppers, grasshoppers, and other insects that are stirred open as buffaloes move about in water. This photo was taken by Middleton Evans using a Nikon F5 with a 600-mm f4 lens and Fujichrome Sensia 100 film; it is also in his album *Rhapsody in Blue* (<http://ravenwoodpress.com>).

## Contents

### Feature Article

#### The Discovery of Insulin: A Case Study of Scientific Methodology

*What do you know about the history of insulin?*

William D. Stansfield . . . . . 10

### Articles

#### What's on the Genetics Test?

*What everyone needs to know about genetics*

Joseph A. Walsh . . . . . 15

#### Understanding the Thermodynamics of Biological Order

*Do living things violate the second law of thermodynamics?*

Jacob Peterson . . . . . 22

#### An Interdisciplinary Guided Inquiry on Estuarine Transport Using a Computer Model in High School Classrooms

*Introducing students to use of computer models to address interdisciplinary, real-life problems*

Kit Yu Karen Chan, Sylvia Yang, Max E. Maliska, Daniel Grünbaum . . . . . 26

### Research on Learning

#### From Phenotype to Genotype: Exploring Middle School Students' Understanding of Genetic Inheritance in a Web-Based Environment

*Investigating 7th-graders' knowledge of genetic inheritance and cell division processes*

Michelle Williams, Beronda L. Montgomery, Viola Manokore . . . . . 35

### How-To-Do-Its

#### Tasty Traits: Introduce Genetics with a Sensory Assessment of Apples

*Sense the difference in learning when students' senses are engaged*

Julie Goldman . . . . . 42

Available online at . . . . . <http://www.nabt.org/websites/institution/index.php?p=637>

#### Using the FAR Guide to Teach Simulations: An Example with Natural Selection

*Using the FAR guide facilitates more meaningful classroom discussions*

Aaron J. Sickel, Patricia J. Friedrichsen . . . . . 47

### Departments

**From the President** • *Unity & Diversity* • Donald French . . . . . 4

**Letter to the Editor** • *Why Science?* • David Zeigler . . . . . 5

**Announcement** . . . . . 5

**Editorial** • *Thank You, ABT Reviewers* • William Leonard, Kathleen Westrich . . . . . 7

**Biology Today** • *A Newer New World* • Maura C. Flannery, Department Editor . . . . . 53

**Book Reviews** • Elizabeth Cowles, Department Editor . . . . . 57

**Classroom Materials Reviews** • Chris Monsour, Department Editor . . . . . 60

**Classroom Media Reviews** • Roberta Batorsky, Department Editor . . . . . 62