



COURTESY OF YAMASHINA INSTITUTE FOR ORNITHOLOGY

The short-tailed albatross chicks arrive on Mukojima island, February 19.

## Albatross Colony "Returned" to Mukojima

A joint international effort has put a new colony of seabirds facing endangerment on the path towards permanent (re-)establishment in the southern-most reaches of Japan. On February 19 this year, the Yamashina Institute for Ornithology transported ten short-tailed albatross chicks from the quake- and eruption-prone island of Izu-Torishima to Mukojima in the Ogasawara or Bonin islands, which was home to the birds until the 1930s. The Institute's researchers hand-raised the chicks on the island for three months until they fledged successfully in mid May.

Support for the Yamashina Institute initiative was provided by not only the Ministry of the Environment of Japan but also the U.S. Fish and Wildlife Service—apparently looking to decrease the many deaths of seabirds from the western Pacific that occur off Alaska when the birds are caught accidentally by longline

fishing vessels. Support was also offered by New Zealand, which is home to a large variety of albatross and likely looking to emulate the re-colonization efforts in the northern hemisphere.

According to Dr. Deguchi Tomohiro of the Bird Migration Research Center of the Yamashina Institute, the foundation work for the initiative was set in 2006 with an experiment to rear another type of albatross in Hawaii by bringing in hatchlings from the Midway Islands. Indications that the homing imprint is made on the seabirds at the fledging site, as backed by data from experiment studies of chick replacement, opened up the way to moving the Izu-Torishima birds to Ogasawara.

Since the fledglings will home in several years after reaching sexual maturity and without doubt will nest there, they and at least forty more that are also to be brought into the new habitat over the next few years will form the basis for the new colony. The avian behavioral information is also seen being helpful for understanding the activities of other birds, some facing the imminent threat of extinction.

The albatross found itself on the Red List of Threatened Species produced by the International Union for Conservation

of Nature and Natural Resources, after being targeted by for-feathers-only hunters (in much the same way Yankee whalers and other for-oil-only hunting parties depleted the whale population).

The Yamashina Institute is now also working to save the Okinawa rail (Yambaru kuina), which is an endemic and also endangered bird species.

## Shots Revolutionized by Peace-Keeping Design

Infectious diseases pose major problems in developing countries, and the global warming trend could lead to millions more people becoming infected. Furthermore, inferior vaccine management and system design make inoculation a difficult task and on occasion cause secondary infections because of re-used syringes.

Dr. Kawasaki Kazuo has come up with a design that covers the complete process of inoculation including vaccine



The Type-1 PKD vaccination kit, for tetanus. Pull both ends of the package and remove the cap. After injection, peel off the plaster and dispose.

production, distribution, storage and disposal as the first concrete goal for his Peace-Keeping Design (PKD) project. The object of the PKD vaccine system is to make it easier and safer to dispense the vaccines in developing countries with graphic design being used as a means of ensuring the inoculation process can be understood without the need to read (in consideration of the low literacy rate in such countries).

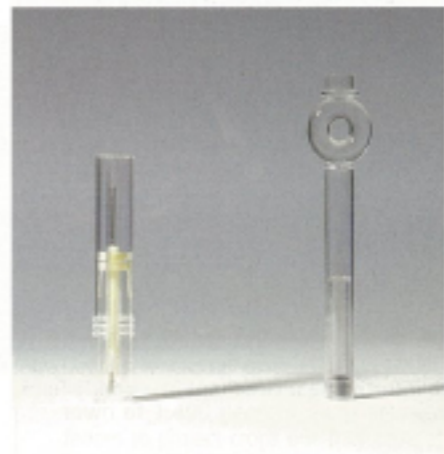
A means of quickly bringing the vaccines to areas in need, such as in the form of "care packages" being parachuted down in "easy-to-find-and-unpack" protective packaging, constitutes an integral part of the project. The PKD syringes are designed to prevent multiple use of the syringe and the needle. In pulling out both ends of the package, the syringe needle comes out of the protective cap and the patient is ready to be injected with the vaccine to be found inside the syringe, which has a flattened hand-piece and is about the size of a "one-inch button" while preventing accidents with the needle since a "guide way" is already provided thanks to the unique design.

Following use, the adhesive bandage/plaster is removed for application to the patient's skin as protection of the injection site and the "USED" indication printed on the set is exposed. Folding the pack enables the used needle to be sheathed and the used set is ready to be disposed of safely.

Two types of vaccine dispensing syringes are available now, the first type being an easy-to-use-and-dispose one while the other one requires assembly of the pre-filled vaccine containment part and the needle-attached part. The second type is to be more useful in the future when dry-powder vaccines, to be inhaled rather than injected, replace fluid vaccines.

The Type 1 PKD vaccination kit comprises flat paper packaging inside which a syringe made of a tough plastic is aligned with the needle and needle cap in a "unit"

reminiscent of a hotel sewing kit. Thanks to its well-designed form, the vaccination kits can be easily stored in compact refrigerators, such cool storage being essential, as vaccines need to be distributed under the right conditions and quickly at that. Day-pack-sized thermoelectrically cooled transportation cases have also been developed to keep the vaccine from deteriorating.



The Type-2 vaccine injection kit

The Type 2 model features two units that are to be assembled for use, with the needle after use being sheathed by the former vaccine containment portion. As an ultimate goal, Dr. Kawasaki notes that Type 2 kits can be converted into an inhaler for delivery of "dry powder" vaccine, with the needle being replaced by an inhalation unit. The new type of vaccine is now being researched at Osaka University. The inhalation system that uses the less painful yet more effective method of vaccination via the lungs is expected to improve vaccination rates further.

### Design Matters

Regarding the problem with realizing and promoting utilization of the PKD vaccine

syringe, the main sticking point is the need for a systematic plan that makes coverage of the production as well as the distribution costs a "socially established" scheme, namely something that is accepted and seen being funded in common by society.

Dr. Kawasaki emphasizes, "We must keep an eye out for the future." And for this, he has been in close contact with other medical institutions around Japan.

Support has been gained for the vaccine effort overseas already, such as from John Allen, inventor and co-founder of the Biosphere 2 project in the United States, and Dr. Amar Bose, chairman and founder of Bose Corporation. He is also promoting an effort to expand the community support base, distributing "ad umbrellas" that carry sponsor names in recognition of funding that such sponsors provide for the PKD project.

PKD is headquartered at Osaka University, which Dr. Kawasaki (who is a professor at the Graduate School of Engineering as well as at the Medical Center for Translational Research) notes is one of the ten vaccine centers in Japan as well as one of a half dozen institutions having a "future medicine" unit. He observes that this university has a long tradition of promulgating Western medicine in Japan, the origin of its medical school being grounded in the Tekijuku school (established in 1838), which prior to Japan opening up to the rest of the world was where Japanese medical pioneers like Ogata Koan and Hashimoto Sanai set up their base.

PKD was first unveiled some sixteen years ago by the highly educated designer (he holds a PhD in medical science and early in his career designed an artificial heart, which even today is on display at the Montreal Science Center as a groundbreaking item). Dr. Kawasaki, who these days suffers from a disease that has him wheelchair-bound and which has motivated him to battle diseases with a passion, espouses the philosophy that "design matters"; that is, form must support function. His assertions are that design is not just "value addition" since usability is a key factor and that a system design considering the social background is a must to make it widely used. □

Chris A. Pomeroy is a journalist and columnist specializing in science and technology.