Messages from Modern Inventors to the Next Generation

8. *With customers' voices UNIQLO's "HEATTECH" is evolving* - Mr. Atsushi Kuwabara, Toray Industries, Inc.



Heat Tech is a fabulous material that not only retains your body heat but becomes warm itself when you wear clothes made of the material. Based on customers' voices that arrived directly at UNIQLO, "HEATTECH" was developed collaboratively by Toray and UNIQLO, and the technologies of Toray as a fiber manufacturer and the advertising/selling capacity of UNIQLO were combined to create a hit product made of the material.

Mr. Kuwabara, Toray's director for technological development, has been involved in product development in collaboration with UNIQLO.

What inspired you to become an inventor/researcher?

When I was a child, my family ran a small factory, which was also my favorite place to play and where I could enjoy making things myself. It was through the observation of the world of ants, which I chose as my summer vacation homework assignment in 2nd grade, that I found science to be interesting. For my observation journal, I observed day by day how ants carry bugs and other things and observed, digging over soil, what a colony of ants looks like. Later, as a representative of all of the students in my same grade, I made a presentation of my journal entries to a large audience, which I suppose inspired me to become what I am now. I also used to wait expectantly every month for a supplement attached to a monthly magazine for "science kids" when I was in elementary school. I especially liked the samples of chemicals in the magazine, and when I ran out, I mixed for fun some "substitutes that apparently looked like the real thing." After graduating from junior high school and possibly as my parents wished, I studied for five years in the chemistry department of a College of Technology in the Japanese educational system, which provides a professional education

for technical and engineering purposes, before going to university and thereafter to graduate school where I continued to study chemistry.

What specific ideas and difficulties have you faced as an inventor/researcher?

A typical "HEATTECH" cloth, consisting of four kinds of fibers (threads), employs state-of-the-art high-tech synthetic fiber technologies, including micro acrylic that is fuzzball-proof and heat-retaining, polyester with an atypical cross-section of fiber that provides rapid absorption of perspiration and is quick drying, vivid coloring, and an antibacterial feature to suppress an undesirable smell and retain performance through repeated washings. Additionally, the material is designed with techniques that draw on the characteristic features of rayon, giving to the material a moist feel, and of polyurethane fiber, allowing the material to stretch for the perfect fit, thereby resulting in a comfortable fabric of new value, which is flexible and thin but warm.

I was the head of a product development team that repeated numerous verifications of performance based on scientific phenomena, and assessments of "comfort and functionality to be found by wearing," of clothing items in our artificial weather room, "Technorama." Our product developers themselves being individual consumers at the same time, through the manufacturing that offers better customer satisfaction, can also feel the features of new "HEATTECH," which has been evolving year by year.



Micro acrylic



Polyester

Cross-section views of typical constituent fibers of "HEATTECH": micro acrylic (above) and polyester (below)

What gives you joy as an inventor/researcher?

The creation of new technologies, which are then widely used to develop new products, is truly significant for researchers like me. I am very pleased when I create a new product that is beneficial to society and with which customers are surely satisfied considering to be excellent. Nevertheless,

my greatest satisfaction is when my idea or hypothesis has been verified by experiment. Through such repetition of hypothesizing and testing, new materials such as "HEATTECH" or new technologies take concrete shape. Newly creating what has not been there before or making possible what has been considered impossible, and making such dreams come true with one's own knowledge, experience and imagination...That is exactly what is interesting about research and development. Even an experience of failure can be useful in one's mind if it is made full use of in the next project. In regard to product development, I believe that only struggling and overcoming failure lead to the fullest extent of one's joy as customers willingly embrace the new product.



The development team led by Mr. Kuwabara repeated numerous experiments in the artificial weather room "Technorama," which can simulate various weather conditions around the world, to determine different appropriate wearability and comfort of a clothing item according to each weather condition.

What message would you like to give to the next generation?

I suppose that in any field, there is something that people find "interesting." If you have not found anything interesting in a particular field, perhaps you have not yet fully understood the field. So I suggest, first of all, that you maintain curiosity about or interest in a wide range of fields, and then keep on making efforts to learn and find something interesting about each field instead of easily giving up. By doing so, you will develop a more refined sensibility to finding something interesting. In addition, I am hoping that you all have a "favorite" field. According to a Japanese proverb, "Love comes around while doing things you like." Once you feel that you "like" something or find it "interesting" or "enjoyable," such feelings can be a driving and motivating force to get you to where you ultimately "want to be."

Modern science has been segmentalized due to specialization, and a high degree of expertise is required to master specific fields. Furthermore, a broad perspective is required, in addition to specialties, to apply them for the purpose of manufacturing products. In this context, I believe that it would certainly be helpful in the future to approach studies from a broader perspective during your school days.



A "mannequin that can sweat" is employed to measure the temperature and humidity (i.e., a sense of being "sweaty") under the clothes under development that it wears.