

Listening To Fragrances

Nobuhiko Tsunefuka

Among the aristocracy in the Heian Period of early Japan there was a popular pastime called *takimono-awase*, whereby they scented their clothes with smoke from incense sticks made by kneading various perfumes together with honey, and vied with one another in the fragrances so produced and their skill in blending the ingredients. Later, in the Kamakura and Sengoku periods, there are said to have been many warriors who used to scent the insides of their helmets and armor with incense so as to concentrate their spirits before going onto the battlefield. Later still, with the flourishing of the Higashiyama Culture in the Muromachi Period, the method for such scenting was systematized, and the practice was elevated to an art known as *kodo*. In *kodo*, the act of smelling fragrances is expressed as “listening to” them. By the Edo Period of recent centuries, a form of the *kumiko* game became popular which used the names of the chapters of the Tale of Genji. This was called *genjiko* and its rules are as follows. The game-master (incense-giver) passes five incense burners around among several players. The players smell the fragrances and have to decide if any burners contain the same kind of incense. As their answers they draw five vertical lines corresponding to the incense burners, plus as appropriate, horizontal bars that join the lines together at the top to indicate sameness. The game-master collects these answers and awards scores to them. Using such horizontal bars to join lines representing burners with the same incense, it is possible to produce 52 different patterns. These patterns are known as the *genjikonozu* (*genjiko* graphs), and each corresponds to the title of one of 52 of the chapters in the Tale of Genji, from *Hahakigi* to *Tenarai*, amounting to all of the chapter titles except the first and final ones, *Kiritsubo* and *Yumenoukihashi*.

- More about *kodo* can be found at:

http://iroha-japan.net/iroha/C01_accomplish/04_kodo.html

<http://www.shinoryu.com/kumikou.html>

- More about *genjiko* and *genjikonozu* can be found at:

<http://www.lahosken.san-francisco.ca.us/anecdotal/hunt/10/3.html>

<http://www33.ocn.ne.jp/~kazz921/kumiko/genjiko/genjikou1.html>



Utensils used in *kodo*

Research on people's various reactions to fragrances is progressing in the field of brain science.

Aroma therapy has been popular among young women and other people recently as part of the healing boom. In Europe and America, aroma therapy is recognized as a form of alternative medicine and has become widespread.

- To learn what Professor Yoshihiko Koga of Kyorin University has to say about fragrances' effects and brain health, visit:

<http://jp.pg.com/febreze/kaori/index.html>

<http://www.brainhealth.jp/lifesympo21/lifesympo21report.html>

- For more about aroma therapy, go to:

<http://camunet.gr.jp/healing/aroma01.html>

- There is information on medical aroma therapy at:

<http://aroma.umin.jp/dantai.html>

Most people will have heard of drug-sniffer dogs, which are active at customs houses in airports and harbors, where they make use of their keen sense of smell to detect drugs in baggage. Lately, dogs have been trained to distinguish between different types of cancer by smelling. These are cancer-detecting dogs. So, following on police dogs, in the future we may see the appearance of doctor dogs.

- For drug-sniffer dogs, see:

<http://www4.ocn.ne.jp/~allee/index3.htm>

<http://www.drug-dogs.com/>

http://www.drugdogs.net/Drug_Detection.htm

- You can read about cancer-detecting dogs at:

<http://www.inetmie.or.jp/~kasamie/GanTantiken0425.shtml>

<http://www.ojpc.net/web-content/ojpc%20dog/top/gantanchi.html>

<http://ict.sagepub.com/cgi/content/abstract/5/1/30>



Drug-sniffer dog on duty

But it is not possible to rely on drug-sniffer dogs alone. Accordingly, R&D is proceeding on high-tech systems that will detect illegal drugs and dangerous substances such as explosives from the spectral patterns obtained by analyzing the absorption spectra of the light that is reflected back when terahertz light is shone at objects. In the 1300 to 650 cm^{-1} wavelength region, patterns specific to particular substances become visible which can play the role of fingerprints identifying types of compounds. Hence, this region is called the “fingerprint region”.

- You can learn about development of a non-destructive detection system for illegal drugs and dangerous substances at:

<http://61.193.204.197/html/20426A07001.htm>

<http://www.mof.go.jp/singikai/kensakiki/houdou/houkoku180608/02.pdf>

- Information about infrared spectroscopy and the fingerprint region is at:

<http://www.chemguide.co.uk/analysis/ir/fingerprint.html>

<http://ja.wikipedia.org/wiki/%E8%B5%A4%E5%A4%96%E5%88%86%E5%85%89%E6%B3%95>

The terahertz band lies between infrared rays and EHF waves, in a region that hitherto had been little used. But recent years have seen advances in materials development and in the application of environmental measurement, biotechnology, nanotechnology and so forth, which have led to the development of terahertz light sources that use semiconductor lasers, and of semiconductor devices that operate with terahertz. It is largely due to these developments that this wavelength region can now be handled.

- For research on and application of terahertz light, see:

<http://www.si-seiko.co.jp/p-news.htm#teraherutu>

http://www.material.tohoku.ac.jp/~denko/phonon_j.pdf

- You can take a virtual tour of Oklahoma State University’s Terahertz Research Laboratory at:

<http://utol.ecen.ceat.okstate.edu/THztour.htm>

It wasn’t so long ago that hard disk capacity was stated in megabytes. Now all of a sudden it’s the age of gigabytes and in some respects we have already passed into the terabyte age. Before long, use of electromagnetic waves will no doubt move from the gigahertz band into the terahertz band. The behavior of electromagnetic waves changes with each change in the frequency band. So, in preparation for the coming terahertz age, EMC engineers must cultivate their sense of smell to be able to “listen apart” the fragrances of the problems involved.

- Read about DVDs and HDDs with terabyte capacity at:

http://gigazine.net/index.php?/news/comments/20060713_50tb_dvd/

<http://www.iodata.jp/promo/bb/products/review/terabyte/index.htm>

- The current state of utilization of millimeter waves in the gigahertz band is described at:

<http://www.ntt.co.jp/news/news05/0508/050811.html>

http://www.soumu.go.jp/s-news/2003/030910_7.html



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1943 Born in Tokyo

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