



A HISTORY . . .

INVENTION OF GEL INK

From quills to fountain pens, people have always attempted to improve writing performance. In the late 1970's, another step in empowering written expression took place. At the time, many writing instrument companies were busy introducing a new technology known as the rollerball pen. This new technology used new, water-based fluid ink in comparison to the commonly used, oil-based ink ballpoint pen.

The Sakura Color Products Corporation, located in Osaka, Japan, wanted to develop a



rollerball pen also, but they were far behind the competitors in launching their version. The market already had four to five strong rollerball competitors in the Japanese market, not even considering the numerous overseas brands offered in the U.S. and European market.

Sakura saw that they would be last-to-market if they developed a rollerball pen and took the bold move to capture a segment of the popular writing instrument market. They decided to go after what no other writing instrument company had been successful in doing: creating gel-based ink. It had been discussed within the industry as possibly the next revolutionary development, but no product research team had been successful in achieving a working formulation.

THIXOTROPIC?

In early 1980, Sakura started researching gel ink which combined the unlikely partnership of both water-based and oil-based ink. Sakura put together a stellar four-person team of its best technicians from its main laboratory in Osaka to work on the project.

During the trial and error phase, Sakura's R&D gel team hit on the hypothesis of thixotropic action. Thixotropic action occurs because when gel stands still it solidifies. When the gel is disturbed, however, its viscosity becomes liquid.

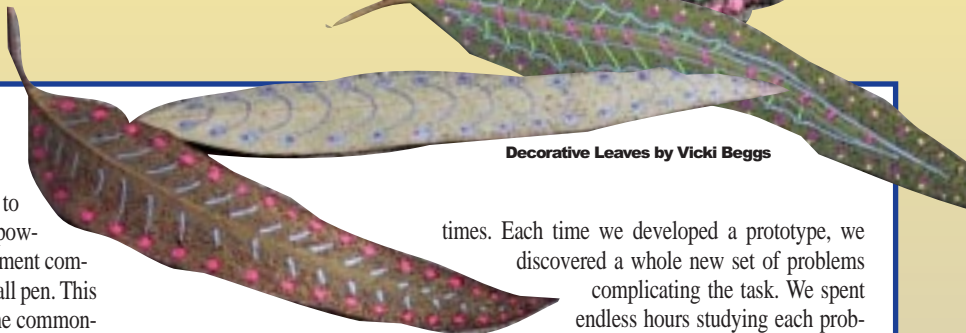
The advantage of thixotropic action with gel ink's solidity is that ink flow remains consistent for the life of a pen. Conversely, ballpoint ink always remains in a liquid state and is sensitive to gravity. Ink will collect at one end of the pen. Ink density and color can be inconsistent and is subject to how the pen is stored.

Sakura's team accumulated more than a thousand materials for creating the ideal gel ink: agar, an extract of red alga seaweed, grated yam, egg whites, and others. Any materials with the properties of jelly were considered.

Mr. Shigeyasu Inoue, one of the original members of the team, remembers the frustrations in discovering a formula, "In the beginning, we failed many



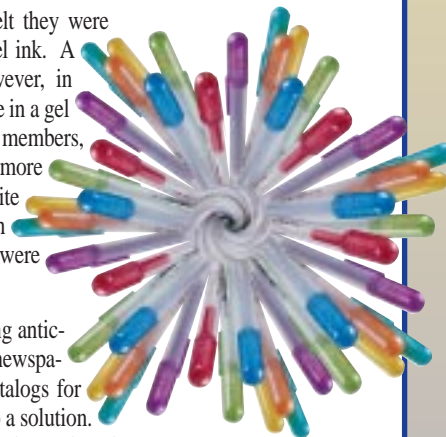
Box Design by Vicki Beggs



Decorative Leaves by Vicki Beggs

times. Each time we developed a prototype, we discovered a whole new set of problems complicating the task. We spent endless hours studying each problem, resolving them one by one. There were many ideas and many led to a dead-end. Others had merit, but could only be tried once we had other issues solved. It was a difficult process."

After many trials, the team felt they were closer to a solution for creating gel ink. A key ingredient was missing, however, in perfecting thixotropic action for use in a gel pen. Sensing completion, the team members, especially Mr. Inoue, became even more motivated to find an answer. Despite many failures, there were enough successes to make them feel they were on the brink of discovery.



Inoue relates the team's building anticipation, "Every day, we checked newspapers, magazines, literature, and catalogs for information which might lead us to a solution. We questioned everything we looked at and read."

Then one day it happened. Flipping through a chemical trade publication, Inoue saw an ad for an ingredient called xanthane gum, a food-additive supplementing fruit jam or gelatin in instant soup. Inoue still vividly remembers the moment, "My eyes suddenly focused and the answer to our problem flashed across my mind!"

Meaningless to most people, the ad spoke about the ingredient's dense molecular weight. The ad also mentioned that xanthane gum was a polysaccharide which is a carbohydrate that can be decomposed by hydrolysis into two or more molecules of more complex carbohydrates like cellulose, starch, or glycogen.

Inoue and the other team members quickly researched this new ingredient, and succeeded in developing a test version of gel ink. They finally had a unique ink with the advantages of both water-based and oil-based ink. A patent was quickly applied for in Japan on October 20, 1982.

MAKING IT HAPPEN

From October 1982 until early 1984, Sakura began developing pen designs for their revolutionary ink. The name chosen for this revolutionary gel pen was Ballsign® combining the words **Ball**point pen and **Sign** pen (sign pen being the generic name used by the Japanese to refer to water-based felt-tip pens.)

In 1984, Sakura surprised the Japanese pen industry with its technological breakthrough. Never thought of as a pen manufacturer, Sakura was best known for making art materials, like Cray-Pas®, the original oil pastels, and Matte® watercolors, primarily used in elementary schools.



A HISTORY



Doodles by Sharon Silver

SELLING A BETTER MOUSETRAP

Getting across the advantages of gel ink to consumers was difficult. Because of the high price of the original gel pens consumers thought it was just an expensive rollerball-type pen. The first gel pen, named Ballsign 280, used a dye-based ink formula, later upgraded to a pigment-based formula.

Because of their decades of experience making art materials, Sakura was expert in refining quality pigments. This was an advantage over most writing instrument manufacturers, which used inexpensive dyes and had little, if any, knowledge of the properties of pigments. While their knowledge of making art materials was head and shoulders above their competitors, their knowledge in making and marketing pens was limited.

PERFECTING THE PRODUCT

In 1985, a second gel rollerball model was introduced: The Ballsign 150. The new gel was pigment-based, giving it superior quality. Other non-gel rollerballs were far less waterproof, not fade resistant, and they were also prone to bleed-through on paper. The new Ballsign 150 surpassed these problems and was introduced at a more consumer-friendly price.

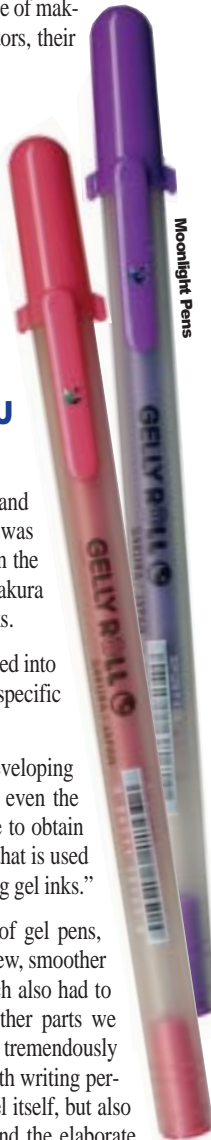
INK TO PENS—NOT AS EASY AS YOU THINK

Unlike ballpoint pen ink, which is oil-based and very thick and pasty, gel ink was water-based and became liquid when the ink was disturbed. The problem was that gel ink needed to be placed in the barrel as a solid. The ingenious engineers and chemists at Sakura developed a new method for manufacturing pens using gel inks.

The original process, still used today, began as gel ink is filled into the barrel, and each of the barrel refills are centrifuged for a specific period where it reaches the optimum gel consistency.

Inoue elaborates on the step-by-step process involved in developing gel ink and the removal of air bubbles. "We discovered that even the length of time and the speed of spinning needed to be precise to obtain the desired writing performance. We found that the small ball that is used in standard ballpoint pens aren't of sufficient quality when using gel inks."

Continuing, Inoue recounts the manufacturing problems of gel pens, "Sakura had to work with the ball part suppliers to develop a new, smoother surface sphere. This also affected the nib holder section, which also had to be improved. Since each part works co-dependently with other parts we essentially had to re-engineer the entire assembly. This was tremendously expensive, but it had to be done." As Inoue explains, the smooth writing performance of the gel rollerball is attributable, not only to the gel itself, but also to the amazing technological engineering of each pen part, and the elaborate manufacturing process.



THE NAME GELLY ROLL® IS BORN

In 1987, Sakura Japan introduced another gel pen, known as BallSign 80. The new model incorporated many new features in its design, further improving Sakura's gel pen writing performance and popularity. This pen quickly became the gel pen of choice with Japanese consumers, both young and old. It was introduced in black, red, and blue colors.

Dissatisfied with domestic market share only, in late 1988, Sakura approached their newly established affiliate in the United States, Sakura of America, to offer its BallSign 80 to the U.S. However, market research showed that U.S. consumers were satisfied with the current regular rollerball pens and would be hesitant to change or try anything else. Because of this, Sakura of America had to take a different approach. The decision was made by Sakura's American management to build and create a new pen category rather than fighting current rollerball suppliers.

For the U.S., a new brand name was chosen for the gel pen: **Gelly Roll®**.

Peter Ouyang, Sakura of America's current marketing director explains the genesis of the brand name, "Not only were we building a brand, but a whole new pen category. I forget how many names went back and forth between Japan and America. We wanted to capture the qualities and essence of this pen in a catchy and descriptive way. We crossed our fingers when we decided on Gelly Roll and now everyone agrees, even our competitors, that Gelly Roll is becoming the generic name for a gel-based rollerball pen."



In 1989, The Gelly Roll series was introduced to the North American market offering the same three colors as in Japan, black, blue and red. Slowly, Sakura began developing more ink colors evolving to the 65 different colors they offer today.

Popularity surged even more when Sakura introduced the Gelly Roll **Metallic** style with nine shining colors in late 1997. This new ink had the ability to write on both white and black paper. Another popular style, Gelly Roll **Lightning®**, which outlines colors in metallic silver, was introduced in 1999. The addition of these two styles cemented Gelly Roll's popularity.

In January 2000, Sakura introduced **Stardust™** glittering gel pens in 12 colors. In the same year, Sakura won the prestigious Inventors Award, given out by Japan's patent office, for inventing the gel ink rollerball. The award officially recognized Sakura's success in developing the world's first gel ink pen and is notable in a country so famous for its new product development. As the new century began, the international writing instrument industry finally recognized gel ink rollerballs as a category in its own right, bolstering Sakura's prestige.

Sakura continues to introduce innovative gel colors and styles. In 2001, an additional 12 dark sparkling Stardust colors were introduced as well as Gelly Roll **Moonlight™**—10 colors that glow under black light.

THE FUTURE OF GELLY ROLL

The Gelly Roll story is not over, but is just beginning. Sakura of Japan's President, Teichii Nishimura, expresses it best when he says, "Although global consumers have recently discovered the gel pen, it is a road we started building 20 years ago. The most difficult work is behind us and we hope to drive Gelly Roll's colors and technology further in the future." Gelly Roll pens embody Sakura of America's motto, Power To Express®, as they strive forward in the evolution of superior writing instruments.