



The History of Wine Grape Research at Michigan State University

By Sharon Kegerreis and Lorri Hathaway

The Michigan State Agricultural Society was established March 31, 1849 through the state legislature for the purpose of promoting the improvement of agriculture in the state.¹ In September of this same year, the society hosted Michigan's first state fair in Detroit.² E.H. Lathrop of Schoolcraft, an organizer of³ and speaker at the fair, condemned the lack of agricultural education, stating, "... four-fifths of the children of our state... will probably pursue agriculture as a profession." He believed that increased training in agriculture needed to be initiated.⁴

One of the society's objectives was to establish an agricultural college in the state.⁵ This objective was achieved in 1855 when Michigan Agricultural College opened in East Lansing, seven years before the enactment of the Morrill Act of 1862 (often referred to as the Land Grant Act). The Morrill Act granted each state 30,000 acres of federal land and directed the proceeds from the sale of this land to provide support for colleges of agricultural and mechanical arts.⁶ The Michigan Agricultural College was the first land-grant college under this act.⁷

In 1857, John C. Holmes served as the college's first secretary and treasurer and was appointed professor of horticulture. Incidentally, Holmes was instrumental in the establishment of the college and was also a founder of the Michigan State Agricultural Society.

The following year, in 1858, the Botany Department offered its first horticulture course. In 1872, the Botany Department became the Department of Botany and Horticulture. William J. Beal served as professor of the department and superintendent of the gardens (later referred to as curator of the botanical museum). Beal greatly expanded the research aspect of the department, even though the research was mostly volunteer work as professors had other responsibilities

during that time.⁸

According to the *Monroe Commercial* in September 18 and October 2, 1873 articles, Beal, also on the committee of the State Pomological Society of Michigan, was impressed with wines produced by Pointe Aux Peaux Wine Company in Monroe County, the state's first winery. Pointe Aux Peaux had seven wines and seventeen varieties of grapes represented at the 1873 State Fair. Beal and other society members toured the winery and vineyards the week of the fair. The committee awarded the winery a gold medal, the first premium award of the Society stating, "Certainly we have never seen any vineyard better laden with fruit or in better condition in any respect, than that at Point Aux Peaux at the present time."⁹

New Horticulture Department and the Rise of Research

In 1883, horticulture became an independent department. Agricultural research in the state was on the rise under the direction of Liberty Hyde Bailey, Jr., who became the department chair in 1885. The importance of research was also recognized nationally with the Hatch Act of 1887,¹⁰ which provided funds through federal land grants to set up experimental agricultural stations for colleges established within the Morrill Act.¹¹

Michigan's first experiment station under the act was established in South Haven in 1889 on the farm of Theodatus Timothy Lyon. Lyon, who had an extensive collection of fruit, including 87 varieties of grapes, also served as President of the State Pomological Society of Michigan and was considered an authority on cultivar identification.¹²

Very little research was devoted to solving the challenges of grape production until the early 1920s when Dr. Newton L. Partridge, Assistant Professor, developed a system for pruning Concord grapevines that increased growth of the vines.¹³

Ten years after the South Haven experimental station was implemented, the state's second station was established in the Upper Peninsula in Chatham. Today (2009), there are 15 agricultural experiment stations across the state.¹⁴

1970s

Decades later, on June 15, 1969, Alabama Native Dr. G. Stanley Howell arrived at Michigan State University after earning his bachelor and masters degrees in horticulture from Mississippi State University and his doctorate in horticulture at the University of Minnesota. His research work in Minnesota encompassed the identification of mechanisms used by hardy plants to survive Minnesota's cold winters. He was hired at MSU as a horticulturalist to perform 50 percent research and 50 percent extension work on small fruits: strawberries, blueberries and grapes.

"None commanded the attention statewide that tree fruits did, so they were clumped together even though they had little in common as plants or cultural needs," says Howell.¹⁵

Howell was intent on developing a research base of information for the Great Lakes Region, reflecting its short growing season and challenging climate. Initially, his work entailed a lot of variety testing on strawberries and cultural research on blueberries; though, the long-term viability of the grape juice industry was increasingly of interest.

At the time, 12,000 acres of mature grapevines were growing mostly in Van Buren and Berrien Counties. The grapes varietals consisted primarily of Concord with the remainder consisting of about 10 percent Niagara, one percent Delaware, less than one percent French-American hybrid varietals and only five acres of European vinifera varietals.¹⁶

The Concord grapes were mostly used to produce juice at the Welch's plant in Lawton, though older wineries, like St. Julian Wine Company, Michigan Wineries (now Warner Vineyards), both of Paw Paw, and Bronte Champagne and Wine Company of Keeler, were using these grapes to craft sweet dessert wines like muscatel, port and sherry.

Howell became intrigued with the study of these grapes and started working closely with juice grape growers and users in the southwest region. To learn the science of grape growing, Howell studied Partridge's early hands-on research, as well as research by Nelson Shaulis of Cornell

University's New York Agricultural Experiment Station in Geneva (NYAES). Howell was also influenced by work at University of California Davis.¹⁷

One of Howell's first tasks was to conduct research on behalf of the National Grape Cooperative, a grower-owned group that grows grapes for Welch's. Operating funds and a field team motivated his efforts toward research of the state's widely-grown grapes varieties of Concord and Niagara.

It was in the bountiful grape-growing region in southwest Michigan when Howell, doing blueberry fieldwork at the time, discovered Bronte Champagne and Wine Company in Keeler. Along with C.M. Hansen of MSU's Department of Agriculture Engineering, Howell stopped by Bronte, as Hansen had heard the winery was producing good sparkling wines.

Howell found a fully-bearing Baco Noir vineyard – and other French-American hybrid grapevines, including De Chaunac, Chelois, Aurore and Seyval. Winemaker Angelo Spinazzé had planted Baco Noir in 1954.¹⁸ During this visit, Spinazzé asked Howell if MSU, being an agricultural school, could help the state's wine grape growers – similar to what was being done in New York, Ohio, Pennsylvania and Canada.

Howell quickly learned that MSU's administration had a history of concern with promoting alcohol in any form and ran into obstacles for assisting wine grape growers with research. Within a year, in 1970, with support from MSU College of Agriculture and Natural Resources Dean Dr. Lawrence Boger and Department of Horticulture Chair Dr. John Carew, Howell was encouraged to proceed with wine grape research, including the production of experimental wines at MSU.

In the Vineyard

In the early 1970s, Spinazzé and UC Davis Graduate Nate Stackhouse, an enologist working for Michigan Wineries (now Warner Vineyards) of Paw Paw, provided valuable access to vineyards for Howell to gain hands-on research. Howell shares that Stackhouse was especially helpful in providing advice as the effort expanded to produce experimental wines.

In 1971, Howell began experimenting with French-American hybrids, including Seibel hybrid selections such as De Chaunac, Aurore, Chelois, Chancellor and Seyval,¹⁹ and Vidal Blanc and Vignoles,²⁰ on the Sodus Township farm that was growing Baco Noir for Spinazzé. The grower, John Leban, had been growing Baco Noir since the late 1930s. Howell also experimented with selections from the Vineland Research Station in Ontario. He spent a lot of extension time assisting both juice and wine grape growers in regard to vine training and pruning them for both yield and fruit quality.

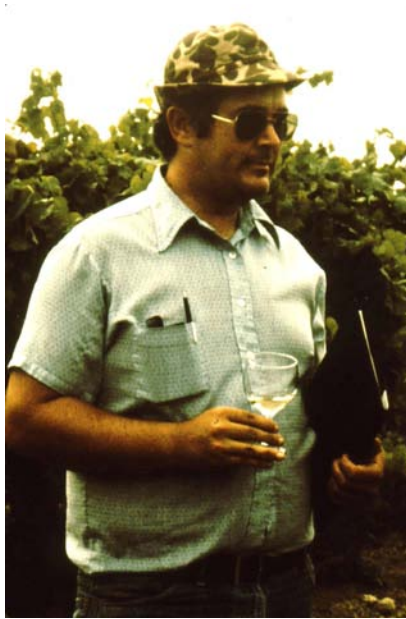
It was also in 1971 that Howell and Stackhouse ventured to northern Michigan's first viable vineyard sites on Leelanau Peninsula. Bernard (Bernie) Rink had planted 35 varieties in Lake Leelanau in 1964. The varieties consisted of French-American hybrids and three vinifera varieties: Pinot Noir, Riesling and Chardonnay. Rink's established vineyard and a vineyard planted near Leland by a retired chemistry professor, Bob Herbst, provided additional field research, particularly in regard to which cultivar could survive the frigid northern Michigan winters and fully ripen in the shorter cooler growing region.

Howell's in-the-vineyard research was instrumental in further launching his interest in wine grape research. In a published presentation for the American Society for Enology and Viticulture in 2007, Howell acknowledged Rink for sharing the quote from Matthew 20:6-7: "Why stand ye here idle; go ye into the vineyard."²¹

Around this time, Howell connected with Len Olson, who, along with Carl Banholzer, had planted French-American hybrids, Vidal Blanc and Aurora, in 1968. In 1969, Olson and Banholzer had expanded their vineyard to 27 varieties, including small acreages of the vinifera grapes of Chardonnay and Riesling.

Howell worked alongside Olson to discover which varieties grew well in Michigan's climate and, ultimately, reflected desired wine qualities in the glass. He also consulted with Apollo "Paul" Braganini of St. Julian Wine Company to support the evolution of Michigan's oldest winery from producing mostly sweeter dessert wines to producing drier-style table wines.²²

From the start, Howell knew it was important to produce wines from the grape varieties that had been proven successful in Michigan's cold climate vineyards. MSU's first experimental wine was crafted after the 1971 harvest under the label Spartan Cellars. Wine was made from grapes grown at two MSU research sites, the Sodus Township farm and at Tabor Hill Vineyards in Buchanan. The final production that first year was 140 gallons of wine, including Vidal Blanc, Baco Noir, Chelois, Cascade, Vignoles, Seyval and the numbered Seibel selection S.10868.²³



Howell in southwest Michigan vineyard in 1972. (Photo: courtesy of Stan Howell)

"We learned a lot with that first batch of wine -- mostly about what errors to avoid the next harvest season," Howell shares.

This hands-on research fired up Howell's interest in juice and wine grapes, and he told his department chair that, "Given the considerable expansion in effort regarding wine grape production and the serious research needs of the existing juice grape industry, a full-time effort was required."

Within five years, his responsibilities were fully focused on challenging grape cultivars, training vine systems and crop control to achieve the highest quality grapes and processed quality. His research evolved through his work at MSU research stations, in prime grower vineyard sites and in

challenging soils, like the meso-climate on MSU's campus. His keen scientific focus on evaluating grape varieties in the vineyard - and in the cellar - led to the evolution of viticulture at MSU.

Howell's research background as a scientist required him to base every decision on data. "I'll show you my data, will you show me yours?" was his philosophy in regard to determining which varieties grew best in Michigan's cold climate. A 1926 study of "Eighty Winters in Orchards" by Frederick Bradford and Horace Cardinell provided data in developing methods to reduce injury to well-established plants. Trial plantings were instrumental in "weeding out" the least hardy cultivars. Recognizing the need to collect year-round data, Howell initiated a cooperative program in the southern hemisphere with colleagues in New Zealand in 1995.

Vinifera in Michigan

It was experiments in science that led Howell to discourage large plantings of vinifera grapevines in Michigan. Howell, with his extensive background in research, believed that Michigan's harsh winter climate would make the production of commercial tonnages of these cold tender varieties a matter of concern every winter. At that time there were no historical data supporting the long-term survival of these grape cultivars in Michigan.

In 1975, Edward O'Keefe, Jr. planted 55 acres of vinifera grapevines on Old Mission Peninsula in Traverse City. This was the state's first large, commercial planting of vinifera grapevines, albeit Tabor Hill Winery had planted a few acres of vinifera grapevines in southwest Michigan in 1969. O'Keefe's varieties included Riesling, Chardonnay and Pinot Noir. Today (2009), his vineyards thrive and consistently produce award-winning wines for his winery, Chateau Grand Traverse.

Howell fully credits O'Keefe for "setting the tone for high-quality vinifera in northern Michigan." Howell also attributes O'Keefe for opening his eyes "to the extraordinary array of fine wines in the world."

In the summer of 1974, O'Keefe funded a research trip to Germany for Howell and Olson. The trio met with German Viticulturist Dr. Helmut Becker, a teacher (and later dean) of the Geisenheim Oenological and Viticultural Institute, renowned for grape breeding and grape grafting. They also traveled to wineries in Italy, Switzerland and throughout Germany to learn more about vinifera wines.

Howell further credits O'Keefe, stating, "The experience had a significant impact on the style of wines produced in our research cellars on (MSU's) campus - particularly Vignoles, which was influenced by wines from the Alsace region of France and the Pfalz region of Germany."

In 1977, Howell was a judge for the state's first-ever Michigan wine competition held at the Michigan State Fair. He has been a wine judge, or Superintendent, at most of the annual wine competitions, except for when he was on research leave or another conflict occurred.

In 1977, MSU's grape research team, consisting of Howell, Stephen Stackhouse, Jim Wolpert, and others, initiated a large Vidal Blanc experiment at Tabor Hill. The experiment consisted of four training systems and six different crop control strategies. The "Seven Year Study," which concluded in 1983, summarized that specific trellising and crop control techniques could dramatically influence the quality of the fruit and the subsequent wine.²⁴

In 1980, Howell was promoted from associate professor to professor.

In 1983, David Miller began working on his masters in horticulture, focused on plant physiology and, specifically, the influence of rootstock in regard to cold hardiness. In 1985, Howell asked Miller to join his grape research team as technician. Miller completed his masters in 1986 and immediately began working on his doctorate degree, focusing on crop loads, testing various canopies and row spacing and sustainable viticulture. Miller soon became research manager and stayed with MSU for 14 years.

One notable research project undertaken by Miller during his graduate work was the extensive research on the use of oak and oak chips in wine. Miller and others wrote papers identifying the various species of oak trees "with the specific ecotypes that influenced regional wood types." Miller concluded that there are five major ecotypes. When the wood is made into wine barrels or into chips and added to the wine, it greatly influences the wine's flavor and aroma. This work earned a patent (U.S. Patent No. 5,102,675)²⁵; and the research conclusions are applied worldwide; however, due to the wording within the patent application, MSU and Miller's work is not credited.²⁶

The Evolution of MSU's Viticulture Program

In the meantime, in the mid-1980s, State Representative (and then Senator) Robert Welborn persuaded the Michigan Legislature to appropriate \$50,000 of the state's budget for additional research in viticulture and enology at Michigan State University.²⁷ Howell's research received \$15,000 of this budget, which enabled Howell to expand his research testing on MSU's campus,

planting varieties and testing them in the toughest growing conditions in the middle of the state, as well as at sites in the heart of the grape and wine producing regions.

Welborn, Braganini and Howell were instrumental in the creation of the Michigan Grape and Wine Industry Council (MGWIC). The council was established in 1985 to promote Michigan's growing wine industry, educate consumers and provide funding for wine grape research. Funding was utilized to construct a fully-operating winery on campus to further wine grape research.

Howell, Miller and various graduate students, including Charlie Edson relied on grapes grown at three research vineyards in the state - on MSU campus, in Berrien County and in Clarksville in Ionia County - to make wine in the wine research laboratory. The purpose of the university's campus winery, called Spartan Cellars, was "to produce wines for testing appearance, color, aroma and bouquet qualities."²⁸



Research indicates that Marechal Foch has great potential in Michigan's climate and soils.

Miller also consulted with Doug Welsch of Fenn Valley Vineyards. Welsch acted as a mentor sharing winemaking knowledge and providing access to his vineyards for testing varieties and implementing growing techniques.

By 1987, MSU had more than 150 wine grape varieties in trial. The grape and research team chose the following as having the most potential in Michigan: Baco Noir, Chancellor, Chambourcin, Marechal Foch, Seyval, Vidal Blanc, Vignoles and the New York selection, GW-9 (later named Chardonnay). Data also suggested that Chardonnay and Riesling could thrive in Michigan on specially-selected sites suitable for these varieties,²⁹ although, by 1989, only 150 acres of Chardonnay had been planted in the state.³⁰

In 1989, Dr. Tom Zabadal joined MSU as coordinator of the new 350-acre Southwest Michigan Research and Extension Center. The purpose of the larger-scale extension is to obtain extensive knowledge to support the growth of wine production in Michigan.

Spartan Cellars Dedication

On February 15, 1991, the first wines crafted in the new Spartan Cellars wine research facility were sampled by Michigan wine industry members at an annual meeting.³¹ And, on April 17, 1992, a formal dedication of Spartan Cellars took place.

By this time, the cellars had evolved into an important wine research and teaching laboratory within MSU's Department of Horticulture since its inception in 1971. Its success was largely attributed to the funding provided by the MGWIC.³² At the ceremony, Howell dedicated the laboratory to the late Stephen Stackhouse, his former associate in wine research, and the late Senator Robert Welborn for their roles in the industry.

In 1997, Miller left MSU for a position as associate winemaker at St. Julian Wine Company, Michigan's largest winery in the state at the time. Miller continues to serve as adjunct assistant professor at MSU in the Horticulture Department and is now vice president of winemaking at St. Julian Wine Company (2009).

Department of Entomology and Department of Botany and Plant Pathology

It is important to note that throughout Howell's tenure at Michigan State University, he worked closely with research specialists from various MSU departments, particularly with colleagues from the Departments of Entomology and Botany and Plant Pathology. The strides made in Michigan's wine grape research have been reliant on productive working relationships with Dr. Angus Howitt and Dr. Rufus Isaacs of the Department of Entomology and with Dr. Donald Ramsdell and Dr. Annemeik Schilder within the Department of Botany and Plant Pathology.



Howell leading planting of Pinot Noir clonal trial in the 1990s at the Northwest Michigan Horticultural Research Station. (Photo: courtesy of Stan Howell)

Michigan's volatile four-season climate makes farming a year-round challenge which, in turn, makes winemaking a challenge. The control of insect and disease pests is a serious concern. The Department of Entomology's "Berry Crops" extension program has provided invaluable research to growers to aid in decision-making on insect management. The department is also working on strategies to benefit from fruit crop pollination. This research has been, and will continue to be, vital to wine grape growers to improve grape yield and quality, as well as enhance the overall environment.

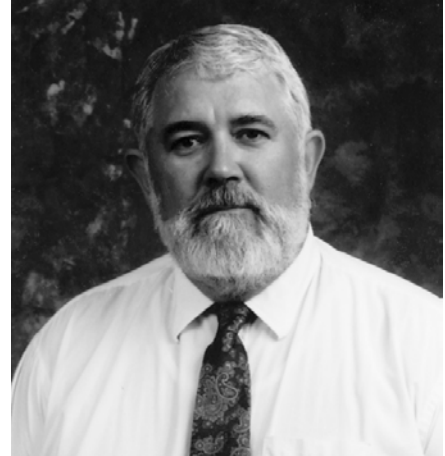
The Department of Botany and Plant Pathology has aided in the identification of diseases and the grape varieties most susceptible to those diseases. In turn, through extensive research, they have provided helpful guidelines to manage fruit production to prevent or minimize these diseases, maximize grape yield and achieve healthy grape production. The department's ultimate goal is to develop environmental and economically sustainable practices for disease control.

Enology and Viticulture Education

In 2001, Howell established MSU's first undergraduate program in Enology and Viticulture within MSU's Institute of Agricultural Technology. Unfortunately, due to budget cuts and the low graduate count from this program, MSU canceled the funding for this program in 2005.³³ Low graduate count was largely due to the class scheduling and the fact that before students finished the program, they were often recruited into the wine industry, as this specific training is highly regarded.

Howell retired from MSU as Professor and Viticulturist Emeritus on September 1, 2006. His leadership in wine grape research since arriving in Michigan in 1969 has been paramount to the direction of Michigan's wine industry. With more than 300 published articles in prestigious grape and wine science and industry journals, Howell has and continues to apply science and data to decision making principles and remains active with efforts to educate the next generation of grape and wine producers through the VESTA program (The Viticulture Enology Science and Technology).

He is recognized as a leading wine grape researcher and has been invited by peers to speak on research topics in important wine growing regions in the USA, Australia, New Zealand, Canada, Mexico, Switzerland, South Africa and Italy. Howell has received numerous awards, including a Merit Award in 2007 from the American Society Enology and Viticulture. Howell, who earned the nickname, “Dr. Grape,” has devoted 40 years of his career to Michigan’s grapes and wine industry.



Howell devoted 40 years of his career to Michigan’s grape and wine industry. (Photo: courtesy of Michigan State University Department of Horticulture)

The year of Howell’s retirement, 2006, Grower and Vintner Joe Herman, Winery Proprietor Don Coe and Miller, as chairman of the grape and wine research advisory committee for the MGWIC, went before MSU’s Dean of the College of Agriculture and Natural Resources to plea for a replacement for Howell upon his retirement. Howell had played a vital leadership and research role in the advancement and growth of Michigan’s wine industry. A new leader to direct MSU’s wine grape research was needed.

A year before, in 2005, Professor of Horticulture Dr. Ronald Perry, along with Miller and Linda Jones of the MGWIC instigated the discussion of implementing a wine appreciation course at MSU, open to legally-aged students regardless of major. Perry wished to model the class after Purdue University’s successful FS 470 wine appreciation class that entailed tasting wines of the world and of Michigan, believing that this type of learning is essential to training Michigan’s future wine industry proponents. In 2008, Perry successfully garnered support from MSU Administration to launch HRT 430, “Exploring wines and vines.”

2009 Viticulture Focus

In 2007, Paolo Sabbatini joined MSU as assistant professor of horticulture to continue research and extension that Howell initiated. Sabbatini, whose position entails 60 percent research and 40 percent extension, is focused on viticulture, “identifying environmental, physiological and cultural factors that limit vine growth and development, fruit maturity and quality.” His

ultimate research goal is to optimize grape productivity and fruit quality in the field. Sabbatini is a native of Jesi (Marche region) in Italy, renowned for its Verdicchio grapes. He earned his masters and Ph.D. in horticulture at the University of Ancona in Italy and moved to the United States in 2004 for his post doctorate work.

Sabbatini, in conjunction with Zabadal and Dr. Duke Elsner, an extension agricultural educator in Grand Traverse County for MSU's Northwest Michigan Horticulture Research Station, continues to test wine grape varieties, crop loads and canopy management techniques. Sabbatini also oversees microvinification at Spartan Cellars, experimenting with non-intrusive methods of vinification using glass or stainless steel fermentation vessels to minimize microbial, wood and other confounding effects.³⁴

As a land grant institute, MSU's focus on varietal testing is paramount. Essentially, the institution is bearing the costs of the trials, rather than the growers taking risks with their crops. This continues to be MSU's viticulture focus, as evident by the current testing (2009) of 50 varieties in test plots on MSU's campus and at the southwest and northwest research stations. Cultivars of particular interest include Marsanne, Roussane, Valvin Muscat and Corot Noir.

Noteworthy, Sabbatini has also planted the Italian grape Prosecco on MSU's campus, believed to be the first planting of this grape in the United States. Sabbatini believes this grape, as well as others from Italy, could play an important role in the evolution of Michigan's sparkling wine industry. Prosecco is from the Veneto region of Italy, where it is used in sparkling and still wines.

Viticulture and Enology Training

In 2008, a new collaboration was established with VESTA. Funded by the National Science Foundation, VESTA is a partnership between the Missouri State University system and other institutions, like Michigan State University, to provide hands-on education in grape growing and winemaking. Interestingly, Howell is a Co-Principal Investigator for VESTA.

In conjunction with Michigan State University's Institute of Agricultural Technology's applied plant science program, students can take online VESTA classes to learn viticulture and enology while earning college credits.

Looking Ahead: 2024

Currently (2009), the Michigan Grape and Wine Industry Council is focused on increasing wine grape production up to 10,000 acres and three million cases of Michigan-produced wines annually by 2024.³⁵ MSU's viticultural specialists are playing a pivotal role in recommending specific wine grape varieties to fit Michigan's diverse site characteristics.

Michigan's landform as a peninsula influenced by its maritime climate poses many challenges to the vintner and the grower. Consequently, MSU's viticulture team, led by Sabbatini and Zabadal, is leading a multi-state variety trial in conjunction with 15 other states called, NE 1020, "*Coordinated Wine Grape Variety Evaluations in the Eastern USA.*"

Variety testing at 25 sites -- including two in Michigan at the Southwest Michigan Research and Extension Center in Benton Harbor and the Northwest Michigan Horticulture Research Station in Traverse City -- were established in the spring of 2008. The project will conclude in 2017. The data collected during these trials will be evaluated and shared among the states. This data will be invaluable to vintners and growers in Michigan and beyond and be instrumental in laying the groundwork for the plantings of additional wine grape vineyards.

Michigan State University has provided, and will likely continue to provide, invaluable support to Michigan's growing wine industry.

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