CHAPTER 190 N A W C C

VENTURA & SANTA BARBARA COUNTY

Chrono Times

Newsletter for Chapter 190 of The National Association of Watch and Clock Collectors July August, 2015

The Atmos Clock

by George Gaglini

Introduction

For centuries scientists have dreamed about the prospect of perpetual motion. And even though Leonardo DaVinci proved its impossibility, much effort has been made, and will continue to be made, pursuing it. Clockmakers throughout history have been intrigued by the concept and they began experimenting with gas-driven mechanisms that promised to accomplish perpetual motion as early as 1663. The dozens of experimental clocks they produced can be considered forerunners of the Atmos. None of them were reliable enough to function outside the laboratory or beyond the prototype stage until a scientist named Jean-Leon Reutter decided to dedicate his life to perfecting a clock that would keep time indefinitely and that could be mass produced. He was born in 1899. He began experimenting with the expansion of liquids and gasses by the age of fourteen. His determination and ingenuity captured the interest of the major clockmakers of his time and ultimately, in 1939, the Swiss company Jaeger LeCoultre, in collaboration with Reutter, began manufacturing and marketing the Atmos clock as we know it.

The Atmos "0"

My First Atmos

In 1972 I was new to California just having arrived in Calabasas from snowy Nashua, New Hampshire, with the purpose of establishing a West Coast Regional office for my employer. But I knew where Ventura Boulevard was in the San Fernando Valley and that a prominent Sherman Oaks jewelry store was going out of business. "Seventy percent off of everything!" the ad said. That day I purchased from that jewelry store a necklace and an Atmos caliber 528 clock. I hadn't seen an Atmos since I was a boy of about 12 in Boston. I pressed my nose against the Shreve, Crump, and Lowe jewelry store window to get a closer look at the most beautiful timepiece I had ever seen. It was an early Atmos and as far out of my reach as the moon.

1972 Atmos Caliber 528

In 1972 I placed that caliber 528 on my mantel and, except for the times it needed moving, it has run ever since. Now, in 2015, on my Ventura mantel, it still keeps perfect time; 43 years and going. No plug, no battery, no crank, no winding key.

What Makes An Atmos Unique?

To my knowledge, all mechanical clocks require the input of energy in order to run. This energy can be in the form of electrical power, battery power, or the reserve power of a mainspring that has been wound or hanging weight that has been lifted. Batteries wear down, electrical power gets interrupted, springs unwind, and weights reach the end of their lines. In all cases, clocks dependent on these forms of energy eventually come to a stop. They can only be started again (or kept running) with fresh batteries, reconnected electricity, re-wound springs, or lifted weights. And so it goes…and has been going since the first mechanical time pieces were invented. Not so with the Atmos. Minute changes in temperature of the air surrounding the Atmos keep it operating. Inevitable temperature changes in earth's atmosphere keep it running almost indefinitely.

Description Of Major Atmos Components

Dial And Hands

Most Atmos dials are round with gold plated chapter rings and hands, although several models have square configurations and black hands. They are attached to the front plate with a backing plate possessing index marks that aid in calibration. While some dials have Arabic or Roman numerals, others have numerals only at the 3, 6, 9 and 12 positions with non-numeric indicators at the 1, 2, 4, 5, 7, 8, and 10, and 11 positions. Generally, the black or gold figures are on a white background but some custom

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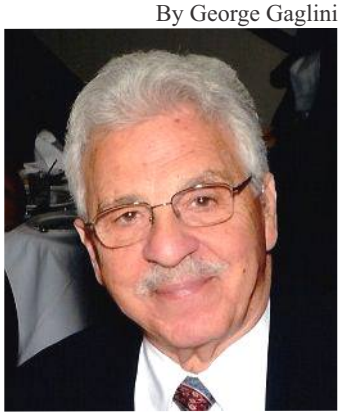
PRESIDENTS MESSAGE

By George Gaglini



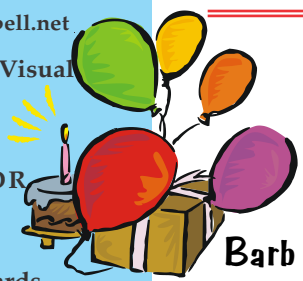
Chapter 190 is one of the fastest growing chapters in the nation. In nine years we have expanded to 175 members. Much of this is attributable to our emphasis on education. In addition to the Field Suitcase Workshop program with many classes filled each year, we also conduct unique two-day workshops for the general public in which participants, regardless of mechanical training or background, are given the opportunity to disassemble and successfully re-assemble a spring wound clock movement. What better way to grasp the essentials of clock design? A large percentage of two-day workshop attendees have become members of Chapter 190 and the NAWCC. For our more experienced members we have conducted special programs such as an advanced lathe class for which we brought in a trainer internationally known in the field.

While we are recognized as an "education chapter," much of our continued growth stems from public outreach. There are stronger, more fundamental underpinnings to Chapter 190 that were there from the very beginning of its existence, long before the present-day education programs. These characteristics continue to provide the foundation of long-term organizational health. For instance, among our members are enthusiasts from all walks of life whose talents are evident to all who attend our meetings or read our newsletter. Those talents are freely contributed and result in such far-reaching projects like the Ward Francillon Symposium and the restoration of the magnificent Santa Barbara County Courthouse clock. Exceptional as these contributions are, they are supplemented by long hours of writing articles for the Chrono Times and arranging programs for each meeting, not to mention time put in to free mini-workshops and round table discussions presented prior to those programs.

So, we also can be described as the "excellence" chapter. Practically every project we undertake, including our acclaimed Annual Mart, is successful because we put our all into it. That "all" includes dedication, talent, and downright hard work.

The credit goes to our members…from those who arrange the tables and chairs at meetings or serve "the best five dollar lunch in town" or browse local shops for door prizes. With spirit and enthusiasm, each member consistently does his or her part in making our chapter great.

George Gaglini



Happy Birthday

July

Barb Barnes, Ed Maldonado, Ron Palladino, Camille Schaetzel, Mike Schmidt, Kathi Sheffrey, & Kim St Dennis

August

John Berney, Alan Bloore, Phil Caulfield, Jim Chamberlain, Pat Fitzgerald, Bill Frank, Royce Hulsey, Ken McWilliams, Merl Meach, Ralph Napolitano, & David Potts,

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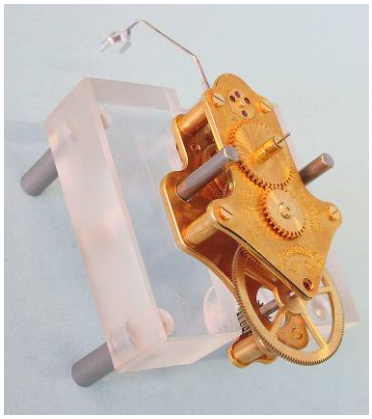
Atmos clocks may have a brown or blue dial background.

The hands are poised or balanced at the factory and have brass reinforcements hidden behind gold or black exteriors. They are pressed into position and can only be removed using appropriate hand pullers, although some technicians may remove the hour hand with finger pressure only.

The Movement

The essential function of the nearly frictionless, jeweled Atmos movement is to turn the minute hand shaft one complete revolution per hour and the cannon pipe one revolution per twelve hours. It accomplishes this through a going train powered by a mainspring. Stored energy in the mainspring applies the pressure needed. This pressure is controlled by an escape mechanism that converts raw power to specific increments of movement. Typically termed "beats" these “tics and tocks” are measured in numbers per hour, or minutes. While a marine clock with a platform escapement runs at the rate of 18,000 beats per hour, the Atmos operates at the rate of 120 beats per hour.



The Movement With Fork

Balance And Suspension Spring

The balance is suspended from the very top of the clock by an elinvar torsion spring 0.183 mm wide and 0.05 mm thick. The spring descends from the very top of the frame through a regulating clamp and extends downward through a tube attached to the balance. It remains in the exact center of the tube for its entire length.

Once set in motion, the suspended balance will oscillate for many hours with no external influence. To prevent this motion from its natural inclination to stop the Atmos movement provides periodic impulses through a lever fork that engages an impulse roller on the balance tube. In a well-calibrated Atmos, the balance commences its rotational travel and receives an impulse from the movement's fork as it passes through front dead center. At about 360 degrees from its starting point, it comes to rest, changes direction, and receives another impulse at front dead center as it travels back to its original position. Thus, the balance travels approximately 360 to 380 degrees from left to right and 360 to 380 degrees from right to left in the period of 60 seconds and continues to do so as long as the fork provides impulses at the correct time with the correct force. The balance travels from stop left to its impulse at front dead center in 30 seconds. It subsequently travels from stop right to its impulse at front dead center in 30 seconds. Because the time and distance is equal on both sides of front dead center, it is considered to be “in beat”.

Balance with impulse roller

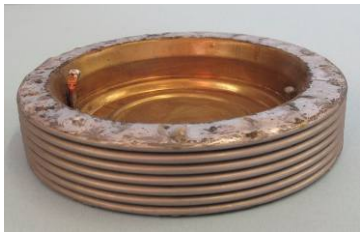
An instrument such as the Microset Timer may be used to calculate these measurements. And, whereas most clocks are calibrated in terms of “beats per hour”, the Atmos, because of its unique design, typically is calibrated in “seconds per beat”.

Some Notes Of Clarification:

The balance is round and may be decorated with several design schemes depending on Atmos models and times of manufacture. Formed weights attached to the underside of the balance come in three thicknesses and are evenly distributed on opposite sides of the balance. More weight slows the clock down, less weight speeds it up. There is a fast/slow adjusting lever at the top of the Atmos for fine calibration by the clock's owner. Each increment on the visible scale increases or decreases the clock's timekeeping accuracy by 10 seconds per day. The lever is center-positioned when the clock leaves the factory or overhaul bench. The lever fork is feather-light with jeweled pallets that interact with the movement's escape wheel. It must be balanced. As the impulse roller enters the fork tines it must have between 0.15 and 0.25 mm clearance on each side.

The Motor

The motor consists of an ethyl chloride gas filled bellows that expands with heat and contracts with cold.



Bellows at 5° C

Bellows at 20° C

Contained in a housing attached to the rear frame, the front surface of the bellows activates a small chain extending to and wrapped around the mainspring arbor. When the bellows contracts it is followed by a powerful coil spring to which the chain end is attached. The chain, pulled backward by the coil spring, turns the mainspring arbor in a winding direction. When the bellows expands it allows the chain to ratchet forward re-wrapping itself around the mainspring arbor.

As the mainspring unwinds it allows the chain to

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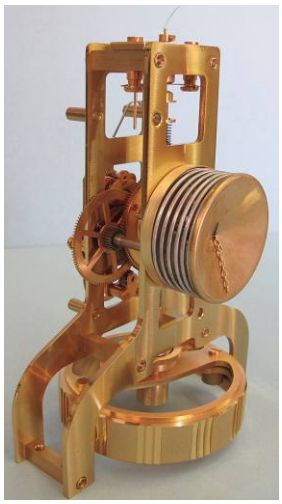
move toward the back of the clock assuring that the powerful coil spring stays in contact with the front of the bellows. When the bellows expands again it allows the chain to ratchet forward and again to re-wrap itself around the mainspring arbor as mentioned above.

The delicate interaction between the bellows, the strong coil spring, the small chain and the mainspring is what keeps the Atmos running without interruption. Should the bellows fail and collapse, the strong coil spring will move the small chain end toward the back of the clock as the mainspring unwinds to its exhaustive limit and the clock will stop.



Completely Wound

Completely Unwound

Some Notes Of Clarification:

The expansion and contraction of the bellows is minute as it responds to minor temperature changes. Two degrees of room temperature change will wind the mainspring enough to keep the clock running for as much as two days. The length (100 mm) and strength of the 52 mm coil spring must be within certain limits for proper functioning. The length of the small chain is adjustable and must be within certain limits for proper clock winding. The mainspring is only powerful enough to drive the nearly frictionless jeweled movement. It measures 60 mm in diameter when lying on the bench. An Atmos can run for over a year with a fully wound mainspring and no motor.

Conclusion

In most respects the Atmos is similar to all other timepieces. What sets it apart and makes it unique is its ability to operate for years, if not decades with no external influence except temperature changes in air surrounding it. This article seeks to explain and clarify how the Atmos accomplishes this seemingly endless or "perpetual" activity. Ultimately even an Atmos will stop. However, when it does, it will have functioned on its own thousands of times longer than any other clock. ■

Fast/Slow Adjust

Tales From the Bench

by Ferdinand Geitner

Measuring The "Speed of Time"

When it comes to gears a watchmaker is often approached to (fix) repair unusual items like mechanical toys or gauges but . . . speedometers?

I received this Smiths speedometer from an enthusiast for service and my first question was "How do I get into it?" It was not clear if the bezel was screwed or snapped on but it was the only way into the case. Old bezels tend to be seized and often one finds chisel or vise grip marks on the plating. This one was perfectly clean so, just to make sure, I soaked it for 24 hrs. with penetrating oil (not too much because I didn't want it to run inside and cause some marking or damage to the face of the instrument).

Then I used my mother's trick for opening stuck Jam jar lids "my leather belt" (see picture). It's the same principle as "Strap Wrenches" for sale in hardware stores.

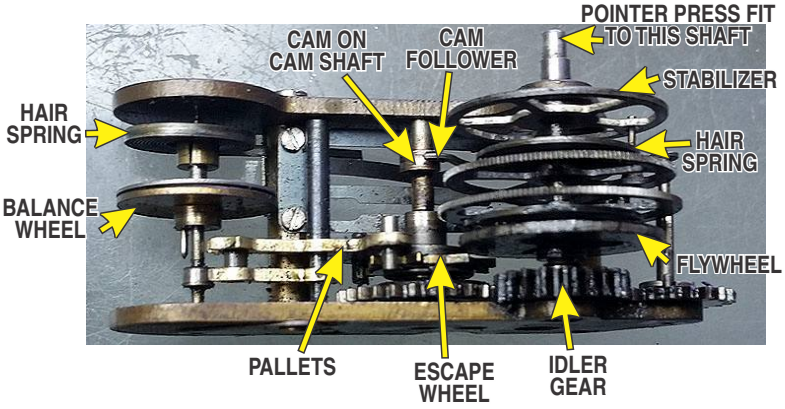
Now there are just two screws holding the mechanism to the case. I had to study the mechanism to ascertain how it worked. A clock indicating speed? A variable (accurate) clock?

The Smith Chronometric Speedometer is based on a patent by Jaeger, in France around 1920. Jaeger set up a company in England. (Jaeger ED), in 1927 which was purchased by Smiths and renamed British Jaeger.

The movement of a chronometric speedometer is strictly an integrated mechanism, the controlling factor being the time base, a conventional watch (or clock) escapement. In this instrument there is no free movement of the hand (indicator) since it is either rigidly locked or geared directly to the driving cable.

The escape wheel is mounted on a small camshaft and is driven through a clutch between it and the driving gear. This gear is directly coupled to the driving cable and provides the power to the escapement. The speed of the camshaft is maintained at a constant figure by the timing of the escapement. The clutch slipping when the driving speed exceeds this figure

Next to the camshaft (not the engine camshaft), one can see the main wheel assembly. This consists of three wheels: the integrator (at the bottom), the recorder wheel (in the center), and the stabilizer (at the top. ■



Horology Trivia

by Giorgio Perissinotto

Telling Time At The California Missions

Until the end of the XVIII century the question "What time is it?" more than being difficult to answer, was really non-sensical. You were notified of the time, but usually you could not ask at will, because there were no clocks or watches on your wrist, around your neck, on a wall or on the mantle. Public clocks were very rare and one had to rely on the notion of "Public Time." And that is the topic of this article.

Let us start with the meaning and origin of the word "clock." The word clock is derived ultimately (via Dutch, Northern French, and Medieval Latin) from the Celtic words clagan and clocca meaning "bell." In several European languages the common word for "clock" is derived from horologia, a Greek word meaning "hour-telling." French horloge, Italian orologio, Spanish reloj (rather disguised), Portuguese relógio, Galician reloxo, Esperanto horlo?o, but German Uhr, Polish zegar, and for the really curious, Nahuatl Tlapōhualtepoztli.

MISSION BELLS

So the choice of a word meaning bell to designate an object used to tell time invites an excursion into the social setting which required people to perform certain activities based on some sort of audible, rather than visible, signal. And that signal was a bell in a public building, usually, but not always, a church. Such buildings had a bell, or a series of bells and constructed with different metals, which were struck mechanically or by a human using a hammer-like tool. So what? You might say, but consider that in order for the bell or bells to be struck at the right "time" there had to be another device or mechanism capable of signaling the right time. The sundial, subject of a previous article, was such a device. The point to keep in mind here is that "knowing the time" for many centuries was not a matter of looking at a timepiece, but rather of being alert and "hear and count" the hours and quarters as struck by bells.

Horological trivia: the well-known French Morbier clock (aka Morez, Comtoise) repeats striking the hours after three minutes, just in case you missed the first count.

When I was growing up in Europe, half a century ago, wrist watches were not uncommon on professional adults, but rarer among the working class and rarer still on adolescents. The custom was, if you were Catholic and had a solvent sponsor, to be given a watch upon Confirmation, which usually happened upon reaching the age of reason (read but question "adolescence and age of reason"). There are analogous rites in Protestantism and Judaism. The public radio networks broadcast the time of day quite frequently, but if walking the streets you had to rely on visible public clocks or on church bells which struck hours and quarters.

But if we go back to the time of the settlement of California by the Spanish, from 1769 onwards, telling time, or being summoned to task at a specific time, was not so simple. Yet it was quite early recognized that there was a need to have a reliable method to segment the working day and to notify the populace of it.

The Franciscan Junípero Serra, recognized as the founder of the 20 plus missions in California, thanked Charles III, King of Spain, for furnishing two bells, one large and one small, for each of the Missions. But in fact several of the bells came from the Jesuit Missions in Baja California who were vacated after the expulsion of the order from the realm in 1867. That there were two bells for each mission also invites speculation. Since the missions had to address the temporal as well as the spiritual needs of the native population, it stands to reason that the large bell was intended to call the new converts to prayer, while the smaller one to work, meals, and rest. From Edith Buckland Webb, "Life at the Old Indian Missions" (University of Nebraska Press, 1952).

The bell ringer was a coveted position and responsibility, as the life of mission Indians was governed for worship, labor, meals and sleep by the sound of a bell. Their day began at sunrise when the Angelus bell called them to prayers in the mission church. An hour later another bell announced breakfast, which was a participatory community affair. After breakfast each resident was sent to the assigned task. From twelve until two the Indians ate their meals and then went back to work until five. The Angelus bell was again rung at six to call to prayers and the supper. It is also thought that this system was standardized for all the missions, with exceptions made for holidays particular to an individual mission.

Such an orderly routine required a reliable means of telling time, or at least to divide the day in hourly segments. It may not be superfluous to mention that bells were also rung at times of emergency, such as natural disasters or an unexpected joyous event.

But all the above is really a call to the question "Were there reliable means of telling the hours during the mission era?" In spite of the often stated notion that there were few, if any clocks in California, there are numerous allusions to both sundials and clocks. Though we might like to think that California's days were all of "unmixed sunshine," it was, and was not, always so, thus making the sundials useless if an overcast sky lasted for several hours or days.

The July Chapter 190 Meeting
is July 19, 2015
Sellers may start setting up at 11:30
The Mart is open from 12:00 til 1:15
The Meeting starts at 1:15

"How Rotating Mystery Clocks Work "

Presented by Jim Chamberlain

Jim is going to reveal the secret of these clocks, but don't tell anyone.

Bring a special clock, watch, or tool of yours to share with fellow members for show and tell

Lunch is FREE for the July meeting

We are having a pot luck lunch and the chapter is providing the chicken

If you would like to contribute something to the lunch, contact Sue Gary
shg2753@yahoo.com

This Month's Mini-Workshop
Starts At 11:00AM

The workshop will be led by George Antinarelli. This is an open forum workshop, so bring your problem clock or watch and let the group help you.

Don't let your clock problems baffle you, come and let our experts confuse you.

Educational Opportunities

by ***Mike Schmidt***

Chapter 190 continues to offer our popular "Introduction to Antique Clock Collecting & Repair & Maintenance" workshop. This 2 day workshop is open to members, friends and the public. The only prerequisite for this workshop is "Interest & Curiosity" in Mechanical Clocks. All tools, movements, and knowledge will be supplied.

The next workshop is Sept 26th & 27st at the Historic Dudley House Museum in Ventura.
For further information contact Mike Schmidt
(805) 988- 1764 or email EagleCreekClocks@msn.com

A FSW 102 ***"Time & Strike Spring Barrel with Rack & Snail Strike"*** is scheduled for 2 weekends, October 17-18 & ,24-25. Instructor is Lex Rooker. The coordinator is Walter Pickett- for further information contact Walter at (562) 208 8923 or email: pickettlakewood@aol.com

A FSW 200 ***"Fundamental Skills for Lathe & Clock Repair"*** Part 1 is scheduled for 4 days February 26-29. For further information contact Mike Schmidt 805 988 1764 or email eaglecreekclocks@msn.com

A FSW 301 ***"Introduction to Basic Pocket Watch Repair-American Watch***" is scheduled for January 22-25 2016. For further information contact Mike Schmidt

Other workshops will be scheduled as interest develops: These may include, ***FSW 301 Pocket Watch, FSW 302 Wristwatch, FSW ,201,202 Lathe Workshops FSW101 Introduction to American Clocks, FSW104 Fusee & Vienna Regulators***, and others .

Complete workshop descriptions and information can be found on the NAWCC website

NAWCC requires 7 students for a workshop. Please let me know what workshops or repair instructions you desire. Contact Mike Schmidt at phone 805 988-1764 or e-mail eaglecreekclocks@msn.com

A chapter 190 2 day workshop for 2015 on ***"Platform Escapements"*** will soon be offered.

Welcome New Members

Steven Stewart
from Oxnard

Joseph Fischer
from Santa Barbara

CLASSIFIED PAGE

This page is dedicated to advertising for Chapter 190 members. It is, of course, free to members.

SERVICES OFFERED

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FOR SALE

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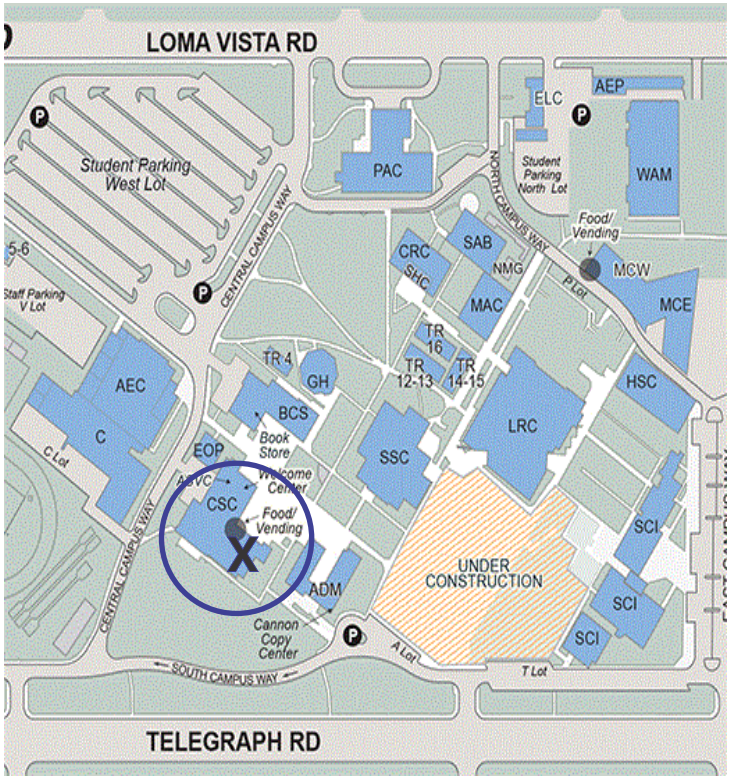
- Chronometer -
Hamilton 21 Marine Chronometer in running condition, with inner box and gimbals; outer box not essential.
Please contact: Giorgio Perissinotto
E-mail: **giorgio@spanport.ucsb.edu**

The Chapter 190 meetings are held the third Sunday of each month. (No meeting in December) We will meet in the Campus Student Center (CSC) on the Ventura College campus. The CSC is located in building "B", east of the gym and



July - August, 2015 Issue

NEXT MEETINGS

JULY 19

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