

NORTHERN CALIFORNIA GEOLOGICAL SOCIETY



SEPTEMBER MEETING ANNOUNCEMENT

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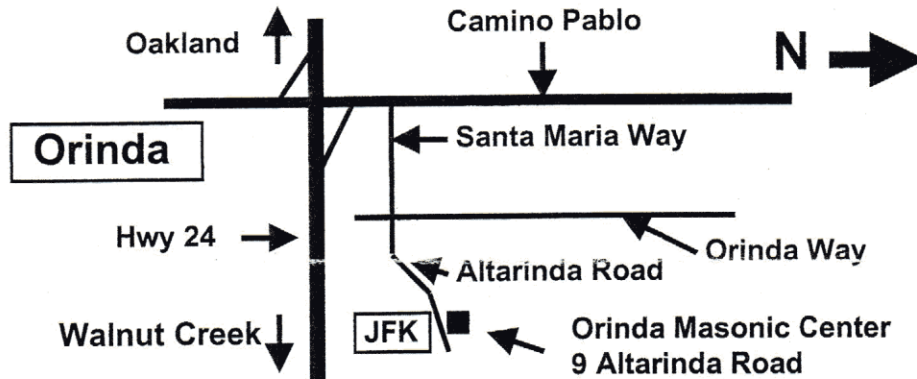
925-294-7530

DATE: Wednesday, September 8, 1999

LOCATION: Orinda Masonic Center, 9 Altarinda Rd., Orinda

TIME: 6:30 p.m. Social; 7:00 p.m. talk (No Dinner)
Cost is \$5.00 per person

RESERVATIONS: Leave your name on the recorder at 925-294-7530 anytime before the meeting.



SPEAKER: Dr. David L. Jones, Professor Emeritus, Department of Geology and Geophysics, U.C. Berkeley

Tectonostratigraphic Terranes of the North American Cordillera: Examples from Alaska and California

Much of the Continental crust of western North America formed during the Mesozoic by accretion of far-traveled terranes, including scraps of oceanic seamounts, basaltic plateaus, island arcs, ocean-basin sediments, with interspersed fragments of disrupted continental crust. Exotic faunas and paleomagnetic data show that some terranes traveled thousands of kilometers before docking along the margin of North America. Similar analyses have now been carried out throughout the world and extended back in time to the Archean. It is now clear that the principal mode of continental growth has been by terrane accretion, with attendant collisional tectonics, metamorphism, and crustal thickening. Following accretion, terranes may be further disrupted and dispersed in younger tectonic cycles. In California, Neogene displacements along the San Andreas Fault system can be quantified by matching offset terrane fragments.

NCGS Fall 1999 Calendar

- Sept. 8 Dr. David L. Jones *Tectonostratigraphic Terranes of the North American Cordillera: Examples from Alaska and California*
- Oct. 2-3 Mel Erskine et. al. *Vallecitos Syncline Field Trip* (see trip list)
- Oct. 13 Dr. Ben Santer, LLNL
1998 McArthur Grant Winner *Global Climate Change: Natural or Human-Induced?*
- Oct. 16 Andrei Sarna-Wojcicki *Volcanics of the Bay Area Region Field Trip* (see trip list)
- Nov. 10 Richard Blake *Evidence of an Ancient Asteroid Impact Scar in the Sacramento Valley Area, California*

NCGS Fall 1999 Field Trip Agenda

October 2 -3, 1999 Vallecitos/Coalinga Field Trip Mel Erskine, Tor Nilsen, and Bill Howell

This trip will be an optional one (either day) or two day journey. Saturday will involve a visit to the Vallecitos Syncline of Panoche Valley east of Paicines (near Hollister). Since we couldn't get the access rights we had anticipated, we've made the trip better. After inspection of the Vallecitos Syncline, this field trip will now include a visit to Griswold Canyon. Mel and Tor believe that both of these unusual areas are of great importance to understanding the tectonic evolution of the Diablo Range. For those who would like to stay for dinner, we will set up camp behind the Panoche Inn and prepare a barbecue dinner with all the fixin's. For those who wish to stay overnight, live 6 and 12-string guitar entertainment will be provided by the bar-keep of the Panoche Inn and Bill Howell. A natural "light show" will be provided by the Celestial Heavens (there is no light pollution in Panoche Valley).

On the following day, we will journey to a really cool fossil locality near Coalinga. Bill Howell calls it "Float Hill" because the Pliocene/Miocene fossils (float) are just lying around on the surface waiting to be admired (and collected). The "commonly found" fossils include contorted oysters (up to a foot long), scallops (up to 5-inches in diameter), and branching corals (up to 2 inch diameter and a foot long) which look like petrified wood. Pieces of petrified wood and fossils I can't identify have also been found here. The Kreyenhegan shale is nearby. Its layers peel apart like the pages in an old weathered book. We will also make a stop at the Coalinga Museum to see a wide variety of very interesting cultural and natural artifacts. The latter include a woolly mammoth skull and specimens of benitoite. This will be another unique field trip. Don't miss it! Details to follow!

October 16, 1999 Volcanics of the Bay Area Region Andrea Sarna-Wojcicki (USGS)

This trip will discuss the age and correlation of tephra layers in the greater San Francisco Bay Area. We will visit an area near Mount Diablo where there are several tuffs that formed 12 to 3.4 million years ago. Dr. Sarna will describe how these tuffs can be chemically characterized and correlated, their eruptive sources, and his recent work re-dating tuffs using the Argon-Argon method. Dr. Sarna will also discuss other regional tephra deposits, including a proposed reconstruction across the San Andreas fault system involving units south of Mount Diablo, within the northern Berkeley Hills, in the area north of San Pablo Bay, in the Wilson Grove Formation northwest of Petaluma, and in the Delgada submarine fan west of the San Andreas fault and Cape Mendocino.

Job Opportunity

The California Department of Water Resources will soon be giving an exam for the position of Engineering Geologist (entry-level position). *Those wishing to take this exam must apply before September 16, 1999.* For more information, job specifications, and application forms visit: <http://wwdms.water.ca.gov/person/job/>. Open positions are available at offices throughout the state. Engineering Geologists may work in engineering geology or hydrogeology.

Web Page: <http://wwdpla.water.ca.gov/sd>

Earthquake Susceptibility on the Northern Calaveras Fault Discussed at June 5th Picnic

The June 5th NCGS picnic at Pleasanton Ridge Park was blessed with excellent weather and a superb presentation on seismic hazards along the northern Calaveras Fault by **Patrick Hubbard** of Treadwell & Rollo. Patrick also introduced the group to the basic geologic structure of the Livermore-Amador Valley and the East Bay Hills bounding the Calaveras Fault on the west. A former Chevron geologist who specialized in minerals exploration, he is now involved with groundwater studies and seismic risk assessment. Patrick currently teaches a class for the Pleasanton Parks and Recreation Department addressing the earthquake hazards on the Calaveras Fault with special focus on the Livermore-Amador Valley segment.

Patrick handed out literature prepared by ABAG (Association of Bay Area Governments) and the U.S. Geological Survey, a color map of Alameda County bedrock geology (Graymer et.al., 1996), cross sections depicting the subsurface geology of the Livermore Valley Gravels, several cross sections by various authors taken at five points along the Calaveras between Dublin and Sunol, and a trench wall sketch across the Leyden Creek (Calaveras Reservoir) portion of the Calaveras Fault. The latter provided an estimated slip rate of about 6 mm/yr. at that location, which is a small part of the proposed 44 mm/yr. slip between the Pacific and North American tectonic plates. Patrick displayed a map of the major strike-slip faults in the Bay Area, and then focused on the regional geology of the Pleasanton Ridge-Livermore Valley region. The Calaveras Fault in this locale is hidden by landslides off the ridge slopes, but juxtaposes Cretaceous sediments of the East Bay Hills against Miocene/Pliocene/Pleistocene/Quaternary formations of the down-dropped Livermore Valley and low hills east of the fault. Groundwater characteristics of the Livermore Valley gravel deposits were also discussed. Patrick also noted the right lateral strike-slip nature of the Calaveras Fault, its superimposed thrust features, and associated thrust-reverse faulting in the hills west of the Amador-Livermore Valley. North-south low angle thrust faulting in the Livermore Valley and the Las Positas normal fault in the eastern part of the valley were also discussed. The Livermore-Amador basin once tilted to the west and produced artesian water near the Calaveras Fault. Now it is tipped toward the southwest and drains through Niles Canyon via Arroyo de Laguna to Alameda Creek. The Arroyo Del Valle draining Del Valle Reservoir makes several sharp turns on its way out of the Valley, suggesting fault control. This ended Patrick's talk, and the group left for Bernal Park a few miles north on Golden Eagle Ranch property. The ensuing hike up to the top of Pleasanton Ridge would provide a better vantagepoint to view the Livermore-Amador Valley, Mount Diablo, and the northern Diablo Range to the south.

The Bernal parking lot lies astride the Calaveras Fault as mapped by Tom Dibblee in 1980. The area was also mapped recently by Graymer et.al. (1996) as a large landslide. The group hiked up the Golden Eagle Trail to the top of Pleasanton Ridge and inspected the recharge system for the Livermore Basin to the east. In the distance was Brushy Peak, and to the north-northeast, Mt. Diablo. Low-lying hills of Livermore Gravels cut by the Verona thrust fault occupied the foreground. This lofty ridge provides a spectacular view of the Livermore Valley, a down-dropped block nestled between Mt. Diablo and the northern Diablo Range. It is also a major groundwater basin and a source of the Bay Area's construction gravel.

After this trek, everyone returned to Pleasanton Ridge Park and enjoyed a tasty barbecue lunch of chicken, pork chops, veggie burgers, salads, and bread prepared by Tridib Guha. Afterwards, a few hangers-on took a short drive with Patrick to Tehan Canyon about 1 mile south of the I-580 exit on Foothill Boulevard. This location displays right-lateral offset of the Livermore Gravels and Tehan Creek. It is another piece of the complex tectonic history of the northern Calaveras Fault. Both strike slip and thrusting behavior can be seen along this segment north to Walnut Creek, where the fault ends and transfer of its offsets to other faults in the region are not well understood. Fitting all the pieces of this puzzle together will keep geologists occupied for years to come.

The NCGS extends its sincere thank to **Patrick Hubbard** of Treadwell & Rollo for his excellent discussion of Livermore Valley-Calaveras Fault geology and tectonics. He generously provided several handouts on earthquake hazards and geology of the East Bay Hills to the picnic attendees. Patrick will be teaching a class on earthquake hazards in the Pleasanton region for the Pleasanton Parks and Recreation Department this Fall. Check with the Pleasanton Parks and Recreation District for times and registration information. Special thanks goes to **Tridib Guha** for providing the food and barbecuing expertise, and to our Field Trip Coordinator **Bill Howell** for arranging Patrick's appearance, and for handling the logistics, park facilities, registration duties, and beverages. It was their hard work that made this event possible.

Ohlone Wilderness Field Trip Tests Drivers' Moxie

The monumental NCGS field trip season continued its nonstop agenda on June 26th with the second of **Ron Crane's** triple header on Northern Diablo Range geology. *The Ohlone Wilderness Field Trip* took about 40 members on an exciting jaunt through the northernmost part of the Diablo range from Sunol Wilderness Regional Park to Del Valle reservoir south of Livermore. The outcrops were a little sparse, but the scenery was spectacular. The ridge tops provided an excellent vantage point to examine the structure and geology of the Livermore Valley and areas to the south. The isolation of this region so close to Bay Area civilization can truly be appreciated by taking this 20 mile long trail that links these two popular recreational areas.

The excursion began with a short stop at an outcrop exposed along a railroad cut on Sunol-Pleasanton Road immediately west of I-680 about 1.2 miles south of the Sunol Boulevard-Castlewood exit off the interstate. This ~800 foot long outcrop of tightly folded and faulted Miocene Briones Formation exemplifies the short range geological complexity that can be found throughout the East Bay Hills. Ron took several minutes to lead the group along this outcrop and point out the techniques and structures he used to interpret these complex features. The section included some massive coquina beds indicative of a shallow nearshore marine environment, and pebbly beds derived from a Franciscan terrain. These sediments were derived from an island that is now part of the Diablo Range. The exposure is overlain by Livermore Gravels dipping 15° NE, and includes Pliocene sediments folded with the Briones. To the west on Pleasanton Ridge are Cretaceous beds dipping 55 to 60° W that are thrust over Briones sediments. The "Calaveras" in this area is hidden under massive landslides. According to Ron, there is no data to support right lateral motion along the Calaveras Fault at this location. He prefers to call it a "crunch zone" with several different faults undergoing thrust activity. If the Briones is unfolded, the "Calaveras Fault" zone is moved ~50 miles to the west. The railroad cut reveals sedimentary crossbedding, joints, shear structures, and coquina beds in a unique blend of sedimentary and tectonic features. The site is part of a "flower structure;" a soft sediment deformation feature formed by transpressional stresses that are relieved by upward movement of sediment wedges under forces directed oblique to a strike-slip fault system.

The group reassembled at Sunol Wilderness Regional Park, where Ron lectured on the post-Albian geological history of the northern Diablo Range and the greater Mount Diablo region. Ron has done an enormous amount of work on the structure of the East Bay Hills, Mount Diablo, and the northern Diablo Range. His carefully prepared balanced cross-section diagrams illustrated the five major tectonic episodes in the East Bay Hills/Mount Diablo/northern Diablo Range. These events include pre-Albian (early Cretaceous) shelf and basin development via sediment shedding off the Sierra Nevada batholith, followed by Albian (~100 m.y.) mid-Miocene (~15 m.y.), late Pliocene (~2 m.y.), and recent deformations that have sculpted today's East Bay landscape. Ron pointed out that balanced cross-sections are difficult in this terrain because of major lateral changes and thickness variations of units over short distances. An old geological adage says: if the structure changes, then the stratigraphy has changed, and if the structural geometry is wrong, then the geology must be wrong. However, if the geometry makes sense, then the geology "might" be correct. Mapping in California, therefore, is a challenge that requires careful attention to structure and stratigraphy with emphasis on potential rapid lithologic changes over very short distances. After a short side trip to a streambed outcrop of the Miocene Sobrante Formation (exposures of sandstone, graywacke, and complexly deformed blueschist boulders), the group resumed its trek across the Ohlone Wilderness to Del Valle reservoir.

The vehicles climbed slowly up Welch Creek canyon and leveled off on Sunol Ridge, where everyone was treated to a spectacular view of San Antonio Reservoir and the valleys and hills to the north. The panorama included Sinbad and Pleasanton Ridges west of the Livermore-Amador Valley, Dublin and Las Trampas Ridges farther north, and the southern flanks of Mount Diablo and its frontal thrust ridges that form the northern boundary of the Livermore Valley. To the east of these features lay Brushy Peak and the Altamont anticline, and in the foreground were the Verona and Williams thrust blocks. The panorama was typical of summer in the California Coast Range: golden hills dotted with green oak trees and lush valleys isolated from the chaos of Bay Area civilization-- so close, yet so far away.

The lunch break was held just below 3800 foot-high Rose Peak, nearly the elevation of Mount Diablo to the north. This spot provided breath-taking views of Mount Hamilton and the Lick Observatory to the south, and Mission Peak to the southwest. This point also marked the ominous beginning of vehicle problems. The steep terrane was beginning to make traction difficult for some vehicles, and the altitude affected the engine of one sputtering van. Thanks to **Sandy Figuers'** automotive expertise, the computer to this vehicle was reset and the caravan resumed its journey. The next stop was Murrieta Falls, so named for the infamous frontier bandito who

likely never saw this massive outcrop of sandstone sculpted into narrow channels and plunging waterfalls, now empty in the summer drought. Ron interprets this locale as an olistolith, part of an olitostrome or admixture of exotic blocks in a shaley matrix that were incorporated into the fine sedimentary matrix by non-tectonic processes (this differentiates it from the classic melange assemblage).

The rugged topography tossed another obstacle at the group as it continued its journey towards Lake Del Valle. A wrong turn sent the caravan down a steep hillside, and the uphill return proved more challenging than some vehicles could handle. One vehicle scaled the slope but fishtailed sideways onto a fallen log once it cleared the crest. In-coming President **Don Lewis** helped to extricate the car from its awkward position atop the log. It was as bizarre an initiation rite as anyone could remember, but with the help of several able-bodied members, the car was eventually freed from its perch. The vehicle delays caused some of the last stops to be forfeited, but the scenery compensated for those losses. Several miles of twisting dirt road normally accessible only by backpackers ended the trip at Del Valle Recreational Park.

The NCGS sincerely thanks member **Ron Crane** for planning this unique excursion, and for preparing the guidebook. His detailed mapping has been a major contribution to the geology of the East Bay Hills east of the Hayward Fault and south from the Sacramento Delta region across Mount Diablo and the Livermore Valley into the northern Diablo Range. **Bill Howell** deserves kudos for handling the logistics, registration, food and beverages, and transportation. He was assisted by Past President **Tridib Guha**, who arranged the lunches through Nob Hill Foods in Martinez. And we certainly cannot ignore the technical -- as well as geological -- assistance of Sandy Figuers, without which at least one vehicle might still be stranded on some desolate hill top in the Ohlone Wilderness. Rental vans were driven by **Dan Day** and **Don Lewis**, a President-President Elect duo who often wondered if they had the skills necessary to navigate the vehicles up some rather challenging grades! The Brushy Peak-Ohlone Wilderness-Diablo Range odyssey will continue when **Ron Crane** and **Sandy Figuers** lead the third leg of this triple-header to **Del Puerto Canyon** on August 21st.

22nd Biennial Groundwater Conference

The 22nd Biennial Groundwater Conference "Interconnected Water Supply in California" will be held September 20 & 21, 1999 at the Hyatt Islandia Hotel in San Diego, California. Sponsors include the Groundwater Resources Association of California (GRA), UC Water Resources Center, Department of Water Resources, Water Education Foundation, and the State Water Resources Control Board.

The theme for the 22nd Biennial Groundwater Conference emphasizes the Interconnections of Water supplies in California. In particular, surface and groundwater supplies must be managed as a single resource rather than as separate resources. The conference will offer a concurrent session format to allow water resources managers and professionals an opportunity to exchange technical information related to water quantity and quality issues confronting California and to discuss solutions necessary to address them.

For more information contact GRA executive director Harrison Phipps at (530) 758-3656 or email execdir@grac.org. Registration information and a conference flyer can be found on the web page for the UC Center for Water & Wildlands <http://www-cwwr.ucdavis.edu/>.

1999 Martin L. Stout Scholarship

The Southern California Section of the Association of Engineering Geologists is now accepting applications for the **1999 Martin L. Stout Scholarship**. The scholarship is valued at \$500 and is open to all student members of AEG. The deadline for applications is **October 1, 1999**. Application forms may be obtained by sending your name and address to **Wendy Schell**, Chairman of the Southern California Section of AEG, at **3775 Carmel Avenue, Irvine, CA 92606**, email address is schellbw@aol.com. For information about the Association of Engineering Geologists, visit <http://www.aegweb.org>.

CCGO To Be Represented At International Conference of Building Officials

August 20, 1999

From Betsy Mathieson
Vice President, CCGO
Past Chairman, San Francisco Section of AEG

The Final Action Agenda for the Proposed Changes to the 2000 International Building Code has been published, so we now know which proposed changes of interest to geologists will be voted on at the International Conference of Building Officials annual meeting in St Louis next month. All testimony and votes on Structural code provisions are scheduled to be held on Wednesday, September 15. The schedule, unfortunately, is flexible ("The projected times are approximate and the hearings for a given block of public comments may extend beyond the projected time or may begin earlier than indicated"), but the Structural hearings will not begin earlier than 8:00 a.m. on Wednesday and are projected to end at 11:30 a.m.

I PLAN TO REPRESENT THE CALIFORNIA COUNCIL OF GEOSCIENCE ORGANIZATIONS. AEG PAST PRESIDENT GREG HEMPEN AND PAUL SANTI, CHAIRMAN OF AEG'S ST. LOUIS SECTION, HAVE EXPRESSED INTEREST IN ATTENDING. I HOPE AEG'S ENGINEERING GEOLOGY STANDARDS COMMITTEE AND/OR EXECUTIVE COUNCIL CAN AUTHORIZE THEM TO TESTIFY ON BEHALF OF AEG. INDIVIDUAL GEOLOGISTS ARE ENCOURAGED TO ATTEND AND TESTIFY ALSO.

Information on the hearings is available at <http://www.icbo.org> ("What's New", then "Code Change Agenda Set" and "The 1999 Expo is Coming"). The meeting will be held at the America's Center Convention Center. Four hotels have blocks of rooms for the meeting, but the reservation deadline was last week, about the time the agenda was published. (But at the Costa Mesa hearings, by waiting until a week before the hearings to reserve a room I saved about \$40 per night and avoided an early-departure penalty!) The code hearings are just one part of a large conference. I can't tell from the registration material whether hearing attendees will be required to pay the \$350.00 registration for the full program (all business, education, and social functions).

Several proposed code changes of interest to geologists were settled at the hearings in Costa Mesa, California, in March. (The California Council of Geoscience Organizations (CCGO) testified at those hearings.) Those changes are on the consent agenda for approval without testimony in St. Louis.

Here are the primary remaining issues of interest I have dug out of the Individual Consideration Agenda:

1) S9-99 (structural)

This proposed change is a power grab by the architects' lobby, wherein they are attempting to reassign to "the architect or professional engineer" numerous tasks currently assigned to "a registered design professional." (At least in California, the term "registered design professional" includes Registered Geologists). CCGO succeeded in getting three of the architects' numerous proposed changes modified so that Registered Geologists, and not only architects and professional engineers, will be allowed to classify and investigate soil; determine the scope of soil investigations

including the number and types of borings and the equipment used to drill and sample; and have a fully qualified representative on site during all boring and sampling operations.

In St. Louis, the only allowable motions for S9-99 will be Approval as Modified (as noted in the previous paragraph) and Disapproval. Even with CCGO's modifications, S9-99 contains code changes that should raise the eyebrows of geotechnical engineers, but they were not represented in Costa Mesa. For example, Section 1622.4.2 as proposed to be changed by the architects' lobby (and as modified) states, "Earth-Retaining Structures. The seismic forces and design methodology shall be determined in accordance with a geotechnical analysis prepared by the architect or professional engineer."

Unfortunately, S9-99 still reassigns one task often performed by engineering geologists to "the architect or professional engineer." This is Section 1615.1.1, Site Class Definitions, dealing with soil profile classification based on shear wave velocities. The architects' change states, "Where site specific data are not available to a depth of 100 feet, appropriate soil properties are permitted to be estimated by the architect or professional engineer preparing the soils report based on known geologic conditions." On that basis alone, because no other modifications are permitted, I RECOMMEND CCGO AND AEG ARGUE FOR DISAPPROVAL OF S9-99.

2) S381-99 (structural) Appendix Chapter 33-1, Grading

This proposed change would reincarnate an updated version of the former Excavation and Grading chapter. There is no such chapter in the current Uniform Building Code and none in the 2000 International Building Code as written. The proposed addition of this appendix was disapproved in Costa Mesa but is on the Individual Consideration Agenda for St. Louis because a public comment was received from the proponent after the hearing. On the web site, the proposed appendix is at the end of the file titled "ibc-str5.pdf." It's easy to download with Adobe Acrobat, which is easy (and free) to download if you don't have it. I haven't read the entire proposed appendix, but a building code without a grading section seems to be missing a crucial element. I'll develop a recommended position before St. Louis.

I LEARNED IN COSTA MESA THAT BUILDING CODES ARE NOT WRITTEN BY EXPERTS IN A PUBLIC AGENCY. THEY'RE NEGOTIATED IN BARS AND RESTAURANTS AT A SERIES OF HEARINGS. THIS IS OUR LAST CHANCE FOR THE 2000 INTERNATIONAL BUILDING CODE. LET'S MAKE A SHOWING IN ST. LOUIS SO OTHER PROFESSIONS AND TRADES LEARN THAT THE WORK OF GEOLOGISTS IS IMPORTANT TO PUBLIC HEALTH AND SAFETY, AND WE CARE ABOUT THE FUTURE OF OUR PROFESSION!

Betsy Mathieson
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Dr. David L. Jones received his B.S. degree in Geology from Yale University and his Ph.D. from Stanford University in 1956. He worked for the United States Geological Survey from 1955 to 1985, and was on the faculty of the Department of Geology and Geophysics at U.C. Berkeley from 1985 to 1996. He is now a Professor Emeritus at U.C. Berkeley. Dr. Jones' professional interests include the stratigraphic and structural evolution of western North America; the age, character, and faunas of deep sea siliceous deposits; and the Neogene evolution of the California Coast Ranges.

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