

Metanol  $\text{CH}_3\text{OH}$

$\text{H}_2\text{O}$

Glicolaldeido

Metil-acetileno  
 $\text{CH}_3\text{CCH}$

CS

Observações com APEX  
 $J=10-9$   
170 GHz  
K-lader  
Traçador de gás frio (50 K)  
G331

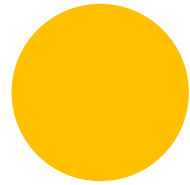
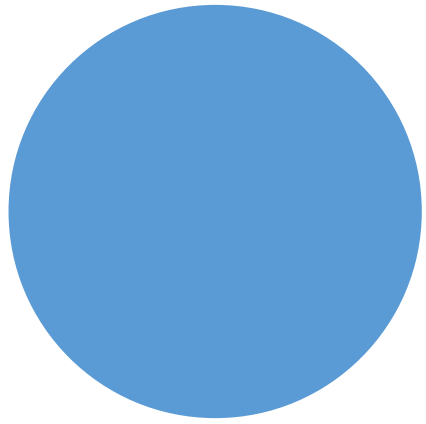
**ALLAM 2019**  
**Astrochemistry LLAMA Meeting**  
Observational Astrochemistry • Astrochemistry in the Laboratory  
Astrochemistry with LLAMA • Theoretical Astrochemistry  
• Astrochemistry and the Origin of Life •  
**AUGUST 8-9, 2019**  
**IAG-USP, São Paulo - Brazil**  
**www.allam2019.iag.usp.br**

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CREDIT: NASA, ESA, AND THE HUBBLE HERITAGE TEAM

LLAMA  
INSTITUTO DE ASTRONOMIA, GEOFISICA E CIENCIAS ATMOSFERICAS  
USP  
FAPESP

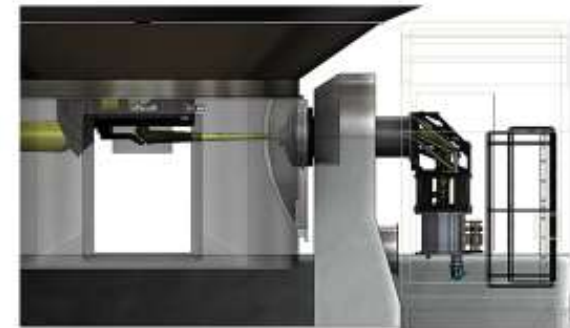
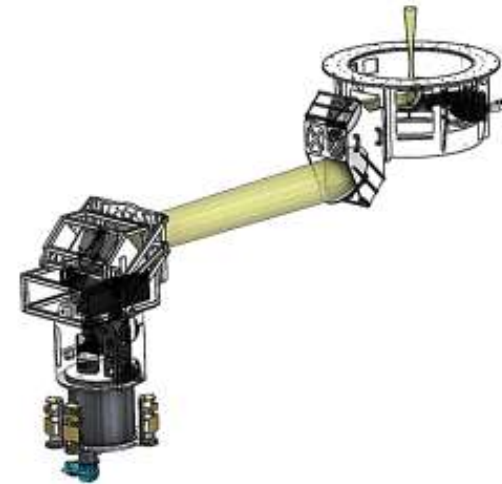


The situation of  
LLAMA in August 2019





ASTRO Electro-Mechanical Engineering LLC  
USA - designed the mechanical parts and set of mirrors  
Based on the optical design of Jacob Kooi  
**Already constructed**









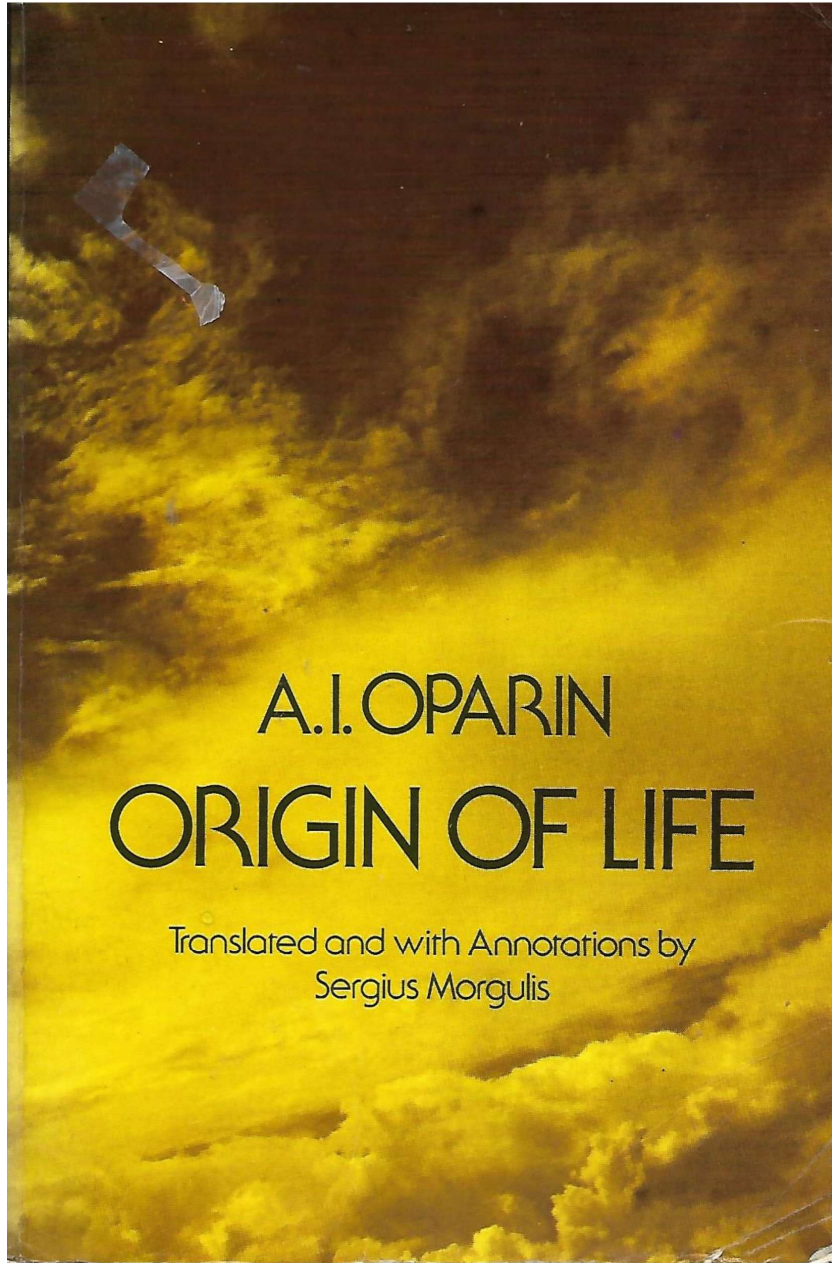
## **Situation of LLAMA in August 2019**

A new organization is being set up in Argentina. LLAMA and QUBICS ( An Italian-French-Argentinean project for Cosmology) will be under a single organization of the site, under the direction of Dr. Alberto Etchegoyen who was responsible on the Argentinean side for the installation of the Pierre Auger Cosmic Rays Observatory

- The plans for a power plant for the joint project, using gas from a gas duct that passes close to the site are detailed, and they are taking the first steps to start it
- The organization is hiring a site manager
- On the Brazilian side: The NACOS (Nasmith Cabin Optical System) -see photos -is nearly ready, now in the phase of alignment of mirrors inside it.
- A calibration Loads System with two temperature-controlled loads is being developed in collaboration with the University of Concepción (Rodrigo reeves). It will be ready in 6 months
- The two receivers for first light (Band 5 and Band 9), and the cryostat in which the will be installed are ready and waiting in the NOVA labs (Groningen)

- A holographic system for adjusting the panels of the antenna is being developed. The holographic receiver will be on loan from ALMA, and the transmitter is being developed in São Paulo
- An optical telescope for first pointing adjustments, with camera, external protection etc has been developed in Sao Paulo
- The last two items are needed for the acceptance tests of the antenna, as soon as it is mounted
- **The big problem that I see:** we cannot set up a clear schedule, because the Argentinean side has not yet guaranteed the funds for the construction of the concrete base on which the antenna will be mounted, and other investment needed on the site. Maybe finding new partners could be a solution.





# The Origin of Life

By **A.I Oparin**, *Associate Director, Bio-Chemical Institute*  
*U.S.S.R. Academy of Science*

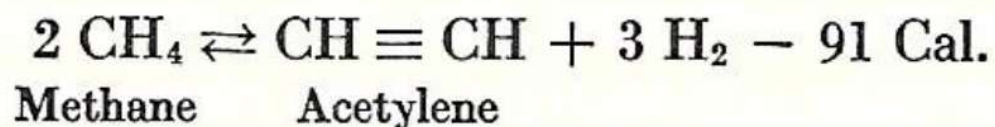
*Copyright 1938* !!!!

But Oparin cites a reference, **H.F. Osborn**,  
The origin and Evolution of life  
London, 1918 !!!

**Oparin did not think about molecules in space.**

He considered **natural mechanisms in the primitive Earth**. Like volcanism, reactions at high temperatures, Superheated steam

He mentions that it was demonstrated that methane, heated at 1000° C, without catalyst changes to acetylene



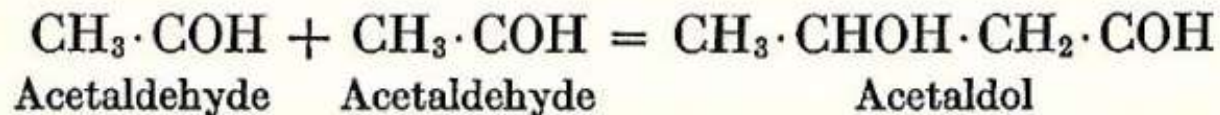
However, in the presence of a sufficient amount of water vapor, we have not merely the formation of unsaturated hydrocarbons but also of the oxidized hydroxy derivatives.



In the presence of oxide of Iron this reaction can take place at 300 C

In addition, OPARIN pays much attention to the reactions that take place **inside living cells**:

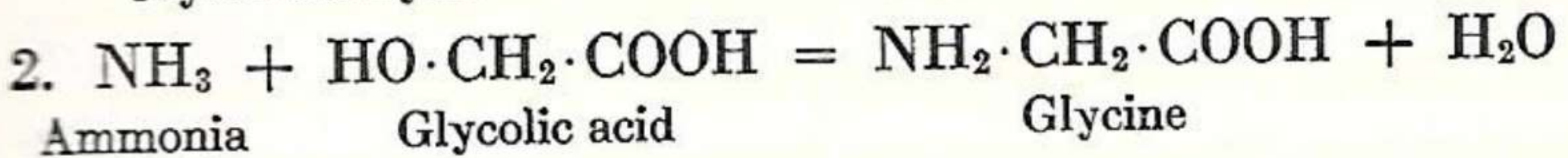
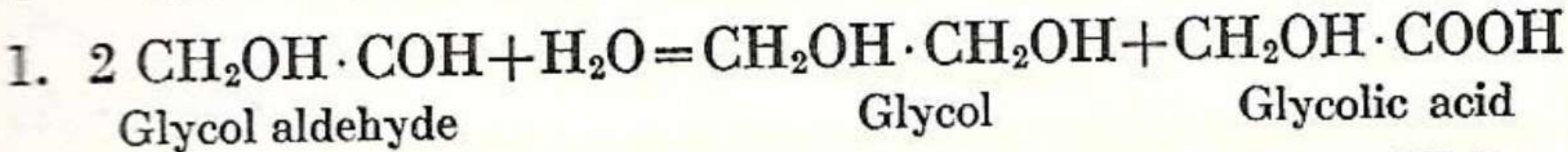
- 1) condensation (lengthening of carbon chain)
- 2) splitting of chains (reverse of previous one)
- 3) polymerization (union between organic molecules through atom of oxygen or nitrogen)
- 4) hydrolysis (reverse process of above splitting unions)
- 5) oxidation-reduction mechanisms



In this reaction two molecules of acetaldehyde become welded together, so to speak, to form a single molecule of aldol, a compound consisting of a four carbon atom chain.



as was shown previously, glycol aldehyde is produced which, by an oxidation-reduction reaction, yields glycol and glycolic acid. The latter reacting with ammonia gives glycine, the simplest of the amino acids:



Other amino acids are formed in a similar manner