

Introduction



In this paper, I will be describing the knowledge of local medicines, the restrictions and taboos that are associated with it in Lamotrek and the basic mathematics that are involved. Local medicine in Lamotrek is one of the many cultural activities that are disappearing from local practices. I believe this is because of the introduction of the modern hospitals with modern medicines and the latest technologies that come with them. In the past the knowledge of local medicine was one of the most important and respected knowledge on the island beside navigation, weather control, divination, weaving, canoe building and house construction. The medicine experts who possess one or more of these kinds of knowledge were well respected in the community and it was because of the knowledge they possess. The people who possess the knowledge of local medicine could make a difference between life and death. Nowadays, these local healers are losing that respect mainly because more and more people are seeking treatment from the modern hospitals when they get sick. So with the loss of respect, more and more knowledge of the local medicines is disappearing alarmingly fast. The few medicine

experts that are left now feel that the knowledge of local medicine they possess has no or very little value to the general communities that they live in. Because of the secrecy of the knowledge and because they feel that spreading the knowledge would be an insult to their ancestors, most of them intend to take the knowledge with them to their graves. Unless something is done now to preserve the knowledge of local medicine, this knowledge is now tracking toward extinction.



A medicine expert is instructing her grandson about the knowledge of local medicine.

There are lots of restrictions and taboos associated with the preparation and making of local medicines. Some of the most common restrictions and taboos will be discussed in this paper. Beside the restrictions and taboos I will also discuss some of the necessary knowledge and skills that go with the knowledge and preparation of local medicines. Without these other knowledge and skills it will be difficult for one to understand and successfully perform the activities involving local medicine.

Counting and Measurement

The people who want to learn the knowledge of local medicine also need to learn some basic mathematics of counting and measurement. The basic mathematics included counting using different classifiers and measurement mostly using body parts. First I will list some of the different counting methods using classifiers, prefixes and root words that are commonly used in the knowledge of local medicines. Some of these counting methods are also found in Alkire's description of classifiers on Woleai Atoll (see Alkire 1970, Table 3, page 9).

Table 1: General Count

<u>Lamotrek counting term</u>	<u>Numerical Symbol</u>	<u>English:</u>
1. <i>Seewe</i>	1	One
2. <i>Ruwouwe</i>	2	Two
3. <i>Seluuwe</i>	3	Three
4. <i>Faauwe</i>	4	Four
5. <i>Limouwe</i>	5	Five
6. <i>Wolouwe</i>	6	Six
7. <i>Fisuuwe</i>	7	Seven
8. <i>Waluuwe</i>	8	Eight
9. <i>Tiiwouwe</i>	9	Nine
10. <i>Seige</i>	10	Ten
11. <i>Ruyeige</i>	20	Twenty
12. <i>Selige</i>	30	Thirty
13. <i>Faige</i>	40	Forty
14. <i>Limeige</i>	50	Fifty
15. <i>Woleige</i>	60	Sixty
16. <i>Fisige</i>	70	Seventy
17. <i>Walige</i>	80	Eighty
18. <i>Tiweige</i>	90	Ninety
19. <i>Sebuguye</i>	100	One hundred
20. <i>Ruyebuguye</i>	200	Two hundred
21. <i>Sangeras</i>	1,000	One thousand
22. <i>Ruyangeras</i>	2,000	Two thousand
23. <i>Sen</i>	1,000,000	One million

When one reaches eleven, it is counted as ten plus one, which will be “*seige me sew*”. Twelve is counted as “*seige me ruwowe*” which is actually “ten plus two” and so forth. When we reach twenty the count is “*ruyeig*” and twenty-one is “*ruyeig me sew*” which literally means “twenty plus one”. When the count reaches one hundred eleven, the count is “*sebuguye me seige me sew*” which is actually “100 plus ten plus one”. Therefore I might say that we have the basis for ones, tens, hundreds, thousands, and millions because if we have any numbers, to say the name is to add by its basis. For example, suppose the number is 1234, the name would be “*sangeras me riuyebuguye me selige me fauw*”, which one can express in numerical symbols as “1000+200+30+4”. This is the same for all the other numbers. When we reach one hundred the count is *sebuguye* and the same method applies to one hundred one all the way to one hundred ninety-nine. The following classifiers *ige* actually refers to group of ten and *biugiuye*, group of hundred and *ngeras*, groups of thousands, etc. As I observe the numbers, I find that only the prefix changes so I might safely say that the prefixes are the actual count and the root word are the classifiers which change with the different things that are counted. ****(See table 3 for more detail of the prefixes-counters and classifiers.)*

Table 2: The Prefixes

<u>Prefix</u>	<u>Meaning</u>
1. <i>Se-</i>	One
2. <i>Riuye-</i>	Two
3. <i>Seli-</i>	Three
4. <i>Faa-</i>	Four
5. <i>Lime-, lima-</i>	Five
6. <i>Wolo-</i>	Six
7. <i>Fisi-</i>	Seven
8. <i>Wali-</i>	Eight
9. <i>Tiwa-, tiwe-</i>	Nine

The numeral count mentioned in Table 2 is what I will call numeral prefixes because they will always have some kind of noun classifiers bound to them. In Table 3, I will discuss more of these noun classifiers that are bound to numeral prefixes. There are two types of general counting but the one discussed in this paper is the one mostly used in the knowledge of medicine. The other general count is used daily mostly in counting things and some people call them enumerative counters. For example, when a person wants to count the number of fish in a group, he uses the enumerative counters.

Table 3: Anatomical Measurements

Count	Meaning
1. <i>Sefiye</i>	One fistful
2. <i>Segatiu</i>	One finger length
3. <i>Seyang</i>	Measurement from the tip of the thumb to the tip of the forefinger when the palm is open.
4. <i>Sepaiu</i>	One arm length when the arm is stretched out
5. <i>Seyefar</i>	Measurement from the other shoulder to the tip of the other arm
6. <i>Sengaf</i>	Measurement from the tip of one arm to the tip of the other arm when both arms are stretched out.
7. <i>Segibe</i>	One foot
8. <i>Segumw</i>	One mouthful

Looking at the prefixes and classifiers in this section, we can see that the prefix is the counter and the classifiers change with the different things that are being counted. For example, *sefiye* means “one”, formed from *se-* (“1”) + *fiye* (“fistful”) (Refer to Table 2). In Table 3, 4 and 5, one can see the different classifiers that are used with the prefix counter *se-* meaning “one”. To count two things, we can just take the prefix *riuye-* and attach it to the appropriate classifier that will identify what is being counted. (Example: *Riuyefiye* = “two fistfuls”). The same method applies to all the other prefixes counters. The meanings

provided in Table 3, 4 and 5 are either the actual meaning of the classifiers or identification of the kind of thing that is being counted.

Table 4: Non- Anatomical Measurements

<u>Count</u>	<u>Meaning</u>
1. <i>Setike</i>	One piece of copra meat
2. <i>Sefaiu</i>	One piece of round object
3. <i>Sebong</i>	One night
4. <i>Seraane</i>	One day
5. <i>Sepileogiu</i>	One bundle
6. <i>Seyali</i>	One leaf
7. <i>Sesheo</i>	One leaf
8. <i>Sepa</i>	One palm leaf
9. <i>Seumw</i>	One bunch of coconut or flowers
10. <i>Setabo</i>	One end piece of something
11. <i>Semwoi</i>	One group of something
12. <i>Sepileogiu</i>	One bundle or group
13. <i>Sepeig</i>	Half of one copra or something
14. <i>Seyaf</i>	One group of eight coconuts or copra
15. <i>Seyafgou</i>	One group of ten coconuts or copra

Table 5: Other Anatomical Measurements/Count

<u>Count</u>	<u>Meaning</u>
1. <i>Magoshig</i>	Measurement of the first joint of the forefinger
2. <i>Magolap</i>	Measurement of the middle joint of the forefinger to the tip
3. <i>Peshanim</i>	Measurement of the width of the palm
4. <i>Wopaiu</i>	Measurement from the tip of one arm to the elbow of the other arm

It is important for one to know these concepts of counts and measurements before attempting to learn the knowledge of local medicine.

The Mathematics

The mathematical concepts in this knowledge involve counting and measurements. There are no written symbols for numbers in the Lamotrek language and therefore we rely only on the oral count. The measurements as one can see rely mostly on the anatomical measurements because we do not have a standard unit of measurement. So to measure something we rely on our body parts to measure against. If there is a need for more accurate measurement, most people use strings or solid objects to measure against.

Raango (Restricted Place)

Raango is a ritual restriction on the use of a particular space that is found not only in local medicines but also in other cultural activities such as navigation, divination, weather control, and so forth. In this paper, I will only touch on the *raangoli tafei*, which is the name that applied to restrictions on space involved in preparation of local medicines. The medicines that involve these space restrictions are more complex and respected than other types of local medicines. The knowledge of such medicine is usually secret and stays within the family. The consumption of such medicine, however, is usually public. If one medicine expert decides to administer this kind of medicine to his patient, the general public in the community is usually informed ahead of time and anyone in the community or selected people from each household will participate in the activities of the *raangoli tafei* and medicine preparation and consumption of such medicine. The restriction goes into effect on the first day of the administration of the medicine and it lasts through the fourth day. First, markers are set up using sticks that are placed around the selected area to be restricted for the purpose of the medicine. Knotted

young coconut leaves (*ubwut*) are tied to the stick poles connecting all the poles together to set apart the restricted or taboo area. Anyone in the community who wishes to participate in the consumption of the medicine will be restricted to certain taboos called *pes* that will be announced by the *tautafei* (medicine expert). This *pes* will continue over a period of four days. Usually, all the participants in the consumption of the medicine will be confined to the restricted area for a four-to-eight-day period. For some medicine experts and their patients, the restrictions may remain in effect for a month or so. The members of the community who participate are usually confined to the *pes* for only four days. Some member of the patient's family and the medicine expert's family sometimes confine themselves more than four days and sometimes for months. The other people who do not participate in the consumption of the medicine are not allowed to enter the restricted area, which is bounded by the *ubwut* (young coconut leaf) markers. Their responsibility during the four days is to bring food for the people inside the restricted area. The food that they bring is placed outside the restricted area where the people inside can reach out and get it from inside without leaving the restricted space. Their other main responsibility is to make sure there are enough coconuts for the people participating in the consumption of the medicine. The coconuts have to be enough for all the people inside the *raango* for the four days of confinement. When the number of coconuts gets low, the unrestricted people outside the *raango* have to get more and place them outside the *raango*. Nothing should pass over the *ubwut* markers. The food and coconuts should go in from under the line connecting the pole boundary of the *raango*. Only food and coconuts are allowed to move into the *raango*. Anything other than food and coconut are not allowed. Even conversation between people inside the *raango* and outside is not allowed. Only selected

persons can make communication from outside and inside the *raango* regarding needs and concerns of either the inside or outside groups.

The people inside the *raango* (restricted area) will only go out of the area early in the morning to collect the ingredients for the local medicine. If they need something from outside the *raango*, they must communicate with people outside of the *raango*. One has to keep in mind that only food and coconuts can pass through the line markers but the medicine expert can make exceptions for any other things on special condition if he or she thinks it is necessary.

The Mathematics

The mathematics involved in this activity includes counting, measurement, estimation, multiplication and division. One needs to count the number of participants in the *pes* (those under restriction or remaining in the restricted area) and measure the size of the area that will be big enough to accommodate the number of participants. The estimation, multiplication and division come in when calculating the number of poles to be erected and the placement of each pole. The number of *ubwut*, young knotted coconut leaves to be prepared, is based on the medicine expert's estimations of the perimeter of the *pes* area. The shape of the restricted area is also considered when calculating what is appropriate for different geometrical shapes.

TTaril Tafei (Collection of Ingredients)



He is searching for ingredients for his local medicine from the medicine plants.

The collection of ingredients begins when the medicine expert starts searching around for places where the main ingredients of the local medicine can be found. Most local medicine has main ingredients, which are called *gapil tiugmeoiul*. These ingredients are the first to go into the medicine pouch. The main ingredients are so important that without them, one cannot continue with the collection and administration of the medicine. The identification of the main ingredients usually takes several days before the medicine expert may make his final decision to go ahead with the medicine. After he identifies all the main ingredients, he then calls together the people that who will be involved in the gathering of the other less important ingredients. These less Important ingredients can be substituted for other ingredients if they cannot be found or the medicine expert can decide to continue the administration without them. The main ingredients (*gapil tiugmeoiul*) will be collected only by the medicine expert himself, his son or his nephew, usually a member of his family because of the secrecy of the medicine. The

other ingredients can be collected by helpers who are chosen by the medicine expert to assist.

The collectors of other ingredients are the close assistants to the medicine expert whom he trusts and who may later possess the medicine knowledge. In gathering medicine that requires restriction of space (*raango*), these are the people who can go out of the *raango* early in the morning to collect the medicine ingredients. They are also the people chosen to be the communicators in most cases.

During collection of the ingredients, the collectors of the main ingredient (*gapil tiugmeoiul*) go straight to the places where the medicine expert had identified the main ingredients. The other collectors go to find the other ingredients on their own. They usually depend on their own past experiences where they have already seen the ingredients. Both *gapil tiugmeoiul* and the less important ingredients are usually collected in pairs of even numbers and that applies to most medicines. For example, one needs to collect eight pairs of mature green *lel*, which actually totals sixteen mature green leaves or six *magoshig*-sized pieces of *lel* skin. All the pairs have to be even numbers.

When all the ingredients are collected, the gatherers go back to a preset site and wait for the collectors of the main ingredients. As soon as the collectors of the main ingredients have gathered all their ingredients, they need to find a place to cut the ingredients into small pieces and then proceed to the preset site to meet the other collectors. When all of the collectors meet up, they proceed together to the preparation site in the *raango*. In the *raango*, the main ingredients will be pounded and put into the wrappers first, and then the other ingredients will be pounded and mixed together before going into the pouch.

For some medicines, even the coconuts for the medicine are collected in pairs of two or four, but most medicines did not have that requirement. The coconuts are collected randomly. Some medicines even have the choices of specific color coconuts.



Here are some examples of the ingredients he collected. In most local medicine the ingredient are collected in pairs.

The mathematics

The mathematics involved in the gathering of ingredients is mostly the different counting that was already introduced in the measurement and counting section of this paper. Sometimes basic addition and subtraction are involved when the collectors added or subtracted the ingredients they collected to see if they collected enough or they needed to throw away some.

Preparation



This is the pounding and mixing of the ingredients together. This picture shows the mixture of a medium-size medicine that will be administered twice a day for two days. In larger medicines with multiple ingredients, the collected ingredients are divided among the collectors and then pounded separately. When the pounding and mixing are done, the mixture is wrapped into one or two pouches depending of the size of the coconut sheath wrapper.



This mixture is ready to be wrapped in the coconut sheath pouch.

After the *tautafei* assistants gather all the ingredients, they return to the restricted space (*raango*) for preparation of the *tafei*. First, they divide up the ingredients among them and each of them cuts his or her share into small pieces and then pounds them together on a

flat board with a special stone called *faiul pwo*. The pounding of the ingredients usually takes about 15-20 minutes or until the ingredients are all mixed into very small pieces so it will be easier to squeeze out the juice. The main ingredients (*gapil tiugmeoiul*) have to be prepared separately by the medicine man (*tautafei*) and go separately into the coconut sheath wrap (*tiugmeoiul*). It will be the first ingredients to go into the sheath wrap or pouch.

The husking of coconuts will be done mostly by the people who are not involved in the collection of ingredients, but if the *tautafei* assistants are done with preparing the pouch early, then they can help out with the other chores like husking of coconut, etc. The number of coconuts to be husked will depend on the estimate of the number of people who will participate in the consumption of the medicine. If the estimate is wrong and the medicine is not enough, only the *tautafei* can authorize another set of coconuts to be cut so the juice can be collected into the big bowl for the second squeezing of the medicine pouch.

After husking, the coconuts are cut and the juice is poured into a large bowl. The pouch of medicine will be put into the bowl and squeezed by one of the *tautafei* assistants. After the squeezing of the pouch, the solution or mixture will be ready for consumption. The first serving will go to the patient and the *tautafei* before serving the other people participating in the ceremony. The *tautafei* usually participates in the consumption of medicines that is open to the general public for consumption.

The above process is repeated during the evening administration of the medicine except for the pounding and wrapping of the ingredients because the same pouch used in the morning will again be used in the evening. The next day the process will start again from the first step, and the process will continue for the four-day period.

The Mathematics

The mathematics that I find in this activity includes the different methods of counting, division and estimations. The different methods of counting are done at several places in the activity. First, one needs to count the number of participants in the ceremony, and then count the number of days of administration of the medicine. The estimation is done when the medicine man estimates the number of coconuts to be husked for the medicine. The division is done when the ingredients are cut into small pieces and divided among the ingredients collectors for pounding and mixing.



The mixture is collected into the coconut sheath wrapper to be wrapped.

Tiugtiugul Tafei (Wrapping of the ingredients)



The mixture is wrapped in the coconut sheath wrapper.



These are the two young coconut leaves that will be knotted and tied in a special way to the medicine pouch.



The coconut leaves are placed together then one end is knotted first.



The leaves are tied to the medicine pouch then before the other end is knotted.

The wrap is made from coconut sheath. The sheath is cut from a coconut tree that has a sheath large enough to hold all the ingredients when pounded and mixed together. Sometimes, the ingredients will be divided into smaller pouches if one wrap is not big enough to hold all the necessary ingredients. Some medicine experts nowadays use the modern plastic insect screening purchased from the store because they claim it can be cut into large enough pieces

for only one to hold all the ingredients. It is also strong enough to resist breaking during the squeezing of the pouch.

When all the ingredients are wrapped into the pouch, the pouch is tied with a coconut fiber taken from the coconut palm leaf. Then two pieces of young coconut leaves (*ubut*) are tied in a special way to the pouch.



This is how the medicine pouch looks after the young coconut leaves are tied to it.

The Mathematics

The math in this activity is done if the ingredients are too large for one pouch to hold so they are divided into smaller pouches as necessary.

Wongiwongil Tafai (Administration- times and days)

Most large medicines involving multiple combinations of ingredients are divided into a series of smaller sets with lesser ingredient combinations and administered first only to the patient. The number of sets in the series depends on how the medicine man decides to divide the ingredients of the large medicine into smaller combination sets. For example, if the

ingredients of a large medicine contain eight pairs of mature pandanus leaves, six pairs of pandanus tops, eight pairs of young pandanus leaves and four pieces of coconut tree skin, then the ingredients will be divided into smaller sets of the mature pandanus leaves and the pandanus tops in the first set and the young pandanus leaves and the coconut tree skin in the second sets. It really depends on how the medicine man wants to divide the ingredients into the smaller sets. When the first set in a series is finished, the next is administered. When all the sets are completed, then all the small sets are combined together and administered as one large medicine that usually is given not only to the patient but also to any member of the whole community for consumption. It usually takes a period of about two to eight weeks to complete the administration of all the smaller sets in a series, and then all the smaller sets in that series are combined and administered as one large medicine. The large combination is the one that involves the restrictions and taboos mentioned in this paper. Each of the small sets in the series is usually administered twice each day, in the morning and evening. The collection of ingredients usually takes place in the morning by the medicine man. The ingredients are pounded together, wrapped in a coconut sheath wrapper, tied with a knotted young coconut leaf and then squeezed into young coconut juice and administered to the patient in the morning. In the evening, the medicine expert uses the same pouch with ingredients that were collected and used in the morning, then squeezes it into fresh young coconut juice and administers it again to the patient. The next morning the medicine expert gathers fresh ingredients as he or she did the first day, and does the same administration. This usually goes on for two days, and then the medicine expert gathers the ingredients for the next set in the same series. Some sets in a series are administered for four day but usually most of the sets are

administered for only two days and they all have to be administered twice a day with fresh young coconut juice with every administration.

Ilas (Culminating Event or Closing Ceremony)



Fish caught for the Ilas. (Closing Ceremony)



Meat for the ceremony



Garden food gathered for the Ilas. (Closing Ceremony)



More prepared food



Some ladies prepare food for Ilas. (Closing Ceremony)

Ilas is the last activity in the series of events that closes the whole ceremony of *tafei* and most, if not all, the restrictions and taboos. During the fourth day, the men go fishing and the women go to the taro patches or gardens and collect food for the culminating event (*ilas*). The food and fish will be prepared outside the *raango* and then brought into the *raango* for the celebration. After the administration of the evening dose of the medicine, all the people who participated in the ceremony gather together and celebrate after the closing of the medicine and its restrictions.

The Mathematics

The math in this activity is the counting of the number of days until the *ilas*. Math is also involved in the calculation and estimation of food and fish to be prepared for the number of participants in the ceremony.



Participants in the tafei ceremony are waiting for the beginning of ilas ceremony.

Other Taboos and Restrictions

Restrictions on eating certain foods

There are other restrictions on some food items like certain types of fish for some medicines. For some medicines, the patient is restricted from eating a certain type of fish for a period ranging from four days up to a lifetime. It is believed that if the patient breaks this restriction or taboo, he will receive a bad omen from the medicine spirit and sometimes this will result in his death. Most medicines do not have this kind of taboo or restrictions but a few rare ones do.

Restrictions on other cultural activities

Some medicines involve restrictions requiring that the patient refrain from certain cultural activities such as weaving, fishing, dancing and so forth for a period ranging from four days up to a life time. As with the above-mentioned restrictions on food, only a few medicines require such restrictions.

Restriction on going to certain places

Because of the disappearance of the sacred spaces (*raango*) from other fields of knowledge like navigation, weather prediction, and divination, the restrictions related to those places also have disappeared.

The Mathematics

In the activities above, it is very important to keep track of the number of days or months for the restrictions that go beyond the four-day period. Some medicine experts thought that breaking such restrictions would bring complications or side effect to the patient or to the one who violated the restriction.



The medicine expert approves of the medicine pouch and she is glad that her grandson learned the knowledge of local medicine. (Dolores & Alex)

Note: All photos in this paper were taken by the author.

Bibliography

- Alkire, William H. 1970 Systems of Measurement on Woleai Atoll, Caroline Islands. *Anthropos*, International Review of Ethnology and Linguistic Volume 65, pages 1-73..
- Marshall, Mac. 1994 Social Isolation, Cultural Competence, and Disability in the Carolines: *Micronesian Counselor #13* (January, 1994: Micronesian Seminar. Accessed: March 12, 2010: URL: <http://www.micsem.org/pubs/counselor/frames/socisofr.htm>
- Metzgar, Eric Harold. 1996. Medicine Magic on Lamotrek Atoll, Documentary, Anthropology, Education, Research, Triton Film: Accessed on March 2, 2010. URL: <http://www.tritonfilms.com/lamotrekmedicine.htm>

Metzgar, Eric Harold. 2004. Sacred Space, Taboo Place: Negotiating Roang on Lamotrek: Micronesian, *Journal of the Humanities and Social Sciences*, Letao Publishing, Albany Australia, Accessed: March 12, 2010. URL: <http://marshall.csu.edu.au/MJHSS/Issues.html>

Metzgar, Eric Harold. 1991. Traditional Education in Micronesia: A Case Study of Lamotrek Atoll with Comparative Analysis of the Literature on the Trukic Continuum: Dissertation, Department of Anthropology, UCLA

People Interviewed:

Ilemaisou, Julie	Female, Age 38, Lamotrek Atoll, Housewife
Ilerigmal, Jucinta	Female, Age 49, Lamotrek Atoll, Housewife/Massage/Medicine Expert
Ilerigyalo, Agnes	Female, Age 55, Lamotrek Atoll, Housewife/Massage/Medicine Expert
Lafagoshie, Dolores	Female, Age 90, Lamotrek, Housewife and Medicine Expert
Letalimepiy, Esther	Female, Age 37, Lamotrek, Health Worker/Dispensary Manager
Letaliral, Patricia	Female, Age 62, Lamotrek Atoll, Housewife/Medicine Expert
Ligtaiwel Richard	Male, Age 60, Satawal Island, Curriculum Specialist
Mailyang, John	Male, Age 64, Elato Atoll, Retired Classroom Teacher
Meiyango, Claudius	Male, Age 55, Lamotrek Atoll, Culture Teacher/Medicine Expert
Pakamai, Peter	Male, Age 65, Lamotrek Atoll, Retired Cook/Medicine Expert
Rachie, Augustino	Male, Age 60, Lamotrek Atoll, Fisherman/Medicine Expert
Taweryan, Juan	Male, Age 56, Woleai Atoll, Teacher Trainer
Uolai, Augustino	Male, Age 58, Woleai Atoll, Curriculum Specialist
Weltefil, Joseph	Male, Age 65, Falalus Woleai, Chief
Yairegit, Alexander	Male, Age 32, Lamotrek, Students/Medicine Expert Assistant

**Note: All of the people I interviewed were involved in the activities of local medicines sometime in the past. Some of them are local medicine experts themselves.*

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