

Artículo recibido el 20 de Septiembre 2022; Aceptado para publicación el 26 de Junio 2023.

Mathematical Aspects and Beliefs about Divination by Sikidy in Madagascar

Aspectos Matemáticos y Creencias sobre Adivinación por Sikidy en Madagascar

Manelo Anona¹ and Joseph Rakotondramavonirina²

Abstract

In Madagascar, beliefs and mentalities are reflected in divination by sikidy. Into the diagonal lines of the mother sikidy are also widely used. Into are considered to be true expressions, and sources of the making of talismans, by combining with plants. An into is a singleton of its orientation group which appears on the table of sixteen columns of sikidy and which is computable. Reading the into used on talismans considered sacred avoids overly fanciful interpretations of divination by sikidy. All into can be found by mathematical calculations.

Keywords: Sikidy; Divination; Into; Boolean group.

Resumen

En Madagascar, las creencias y mentalidades se reflejan en la adivinación mediante sikidy. En las líneas diagonales de la madre, los sikidy también se utilizan ampliamente. Estos se consideran verdaderas expresiones y fuentes para la elaboración de talismanes, al combinarlos con plantas. Un into es un singleton de su grupo de orientación que aparece en la tabla de dieciséis columnas de sikidy y que es computable. Leer el uso de los talismanes considerados sagrados evita interpretaciones demasiado fantasiosas de la adivinación mediante sikidy. Todo se puede encontrar mediante cálculos matemáticos.

Palabras clave: Sikidy; Adivinación; Into; Grupos booleanos.

1. INTRODUCTION

In the 1980s, the meeting between researchers from Center for Documentation and Research on Art and Oral Traditions in the South region of Madagascar and one of the authors of this article generated the discovery of the mathematical aspects of sikidy. The

¹ Professor, Department of Mathematics and Computer Science, University of Antananarivo 101 P.B 906, Antananarivo, Madagascar. email mfanona@yahoo.fr

² Researcher Teacher, Department of Mathematics and Computer Science, University of Antananarivo 101 P.B 906, Antananarivo, Madagascar. email : rakotondramavonirinaj@gmail.com

results of this research are given at the national research conference organized at the University of Fianarantsoa in 2000. The author wrote the article "Mathematical aspect of sikidy" as published in (Anona F.M, 2016).

Divination by sikidy is practiced in all regions of Madagascar. Sikidy practitioners were highly regarded before the introduction of Roman writing in Madagascar, they manage to read the sikidy signs. In the 1950s, the big names of diviners were well known; Behita in the region of Sambava(NorthEast), Adanimparay in Mandritsara (North-West), Mahavalay Daniel in Berenty (South-West).

2.GENERAL INFORMATION ON SIKIDY

The word sikidy originates from the Arabic language "shkil" which means figure. The sikidy is therefore the interpretation of the figures formed by a particular arrangement of the kily or fano seeds spread out on a mat. The choice of seeds is important. The seeds should be almost identical and number around a hundred. Before proceeding to divination, the ombiasa (diviner) counts the seeds two by two. The number of seeds used must be even. The ombiasa then performs a rite of storytelling that recounts the supposed origin of the sikidy while turning the seed set with the right hand. He attributes to the sikidy the power to whisper to the spirits of the ancestors and to argue with the gods.

To make the figures, the ombiasa takes a handful of seeds at random. He makes four piles of seeds, respecting the order of taking the heaps. On each pile of seeds, he pulls the seeds out two by two until only one or two seeds remain. He repeats the operation to have a table of four vertical columns with four horizontal lines, obtained by chance, from left to right.

Sikidy has two aspect variants. In the north of the country, we mainly practice the sikidy "Lavatehezana"; it is a table of two rows and eight columns, read from left to right. In the South and on the West Coast, we speak of "sikidy dabaray" or "sikidy be andamaka".

The "sikidy dabaray" is a table of four columns of four rows from right to left, called mother sikidy, and below the mother sikidy, eight rows of four rows are made from left to right. The names of each place are identical to "sikidy lavatehezana". The "sikidy lavatehezana" appears more like a shortcut of "sikidy dabaray".

A column has the following structure: the first element at the top is the head, the second

the neck or the chest, the third the stomach or the hip, and the fourth the foot. In the sakalava region, the tamarind which gives the kily seeds is revered as a sacred tree. In other regions, other tree seeds or coins are used. These divination objects must be identical.

A seed means death, loneliness, imperfection. A dead person has no spouse. A seed also indicates the color black. Two seeds signify life, perfection. A living person lives as a couple for his descendants. It is also the color white.

2.1 Orientation of sikidy figures

The sixteen figures of sikidy are classified according to the cardinal orientations. The classification below is used mainly in the southwest and south of Madagascar. The letters indexed above each figure (Figure 1, 2, 3, 4) are used to identify the respective figures. (Decary Raymond, 1970)

Figure 1.

Group of the East

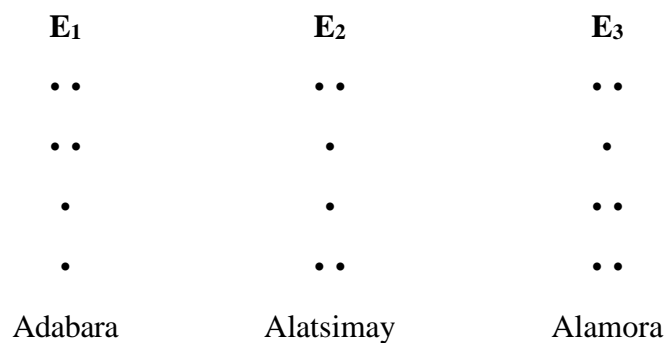


Figure 2.

Group of the North





Figure 3.

Group of the West

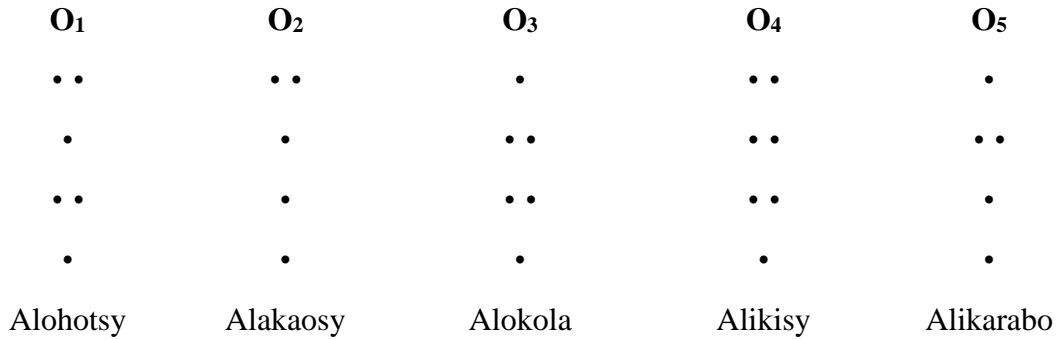
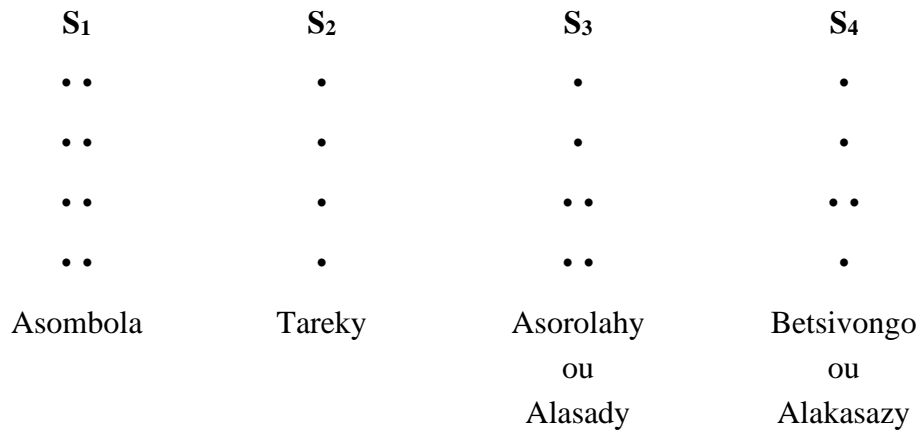


Figure 4.

Group of the South



In the North West region of Madagascar (Figure 3), O_1 and O_2 form a separate group, immigrant group or central group.

For the South-East region of Madagascar, we have another classification which is different from the classification above. The classification is below (Figure 5, 6,7 and 8) (Decary Raymond, 1970) (Rabedimy Jean François, 1976):

Figure 5.

Group of the East

E_1	E_2	E_3	E_4
•	••	••	••
•	•	•	••
••	••	••	•
••	•	••	•
Alasady	Alohotsy	Alamora	Alakaosy

Figure 6.

Group of the North

N_1	N_2	N_3	N_4
•	•	•	••
••	•	••	••
•	•	••	•
••	••	••	••
Adalo	Karija	Alamizaha	Alibiavo

Figure 7. *Group of the West*

O_1	O_2	O_3	O_4
•	••	••	•
••	••	••	••
••	•	••	•
•	•	•	•
Alokola	Adabara	Alikisy	Alikarabo

Figure 8.

Group of the South

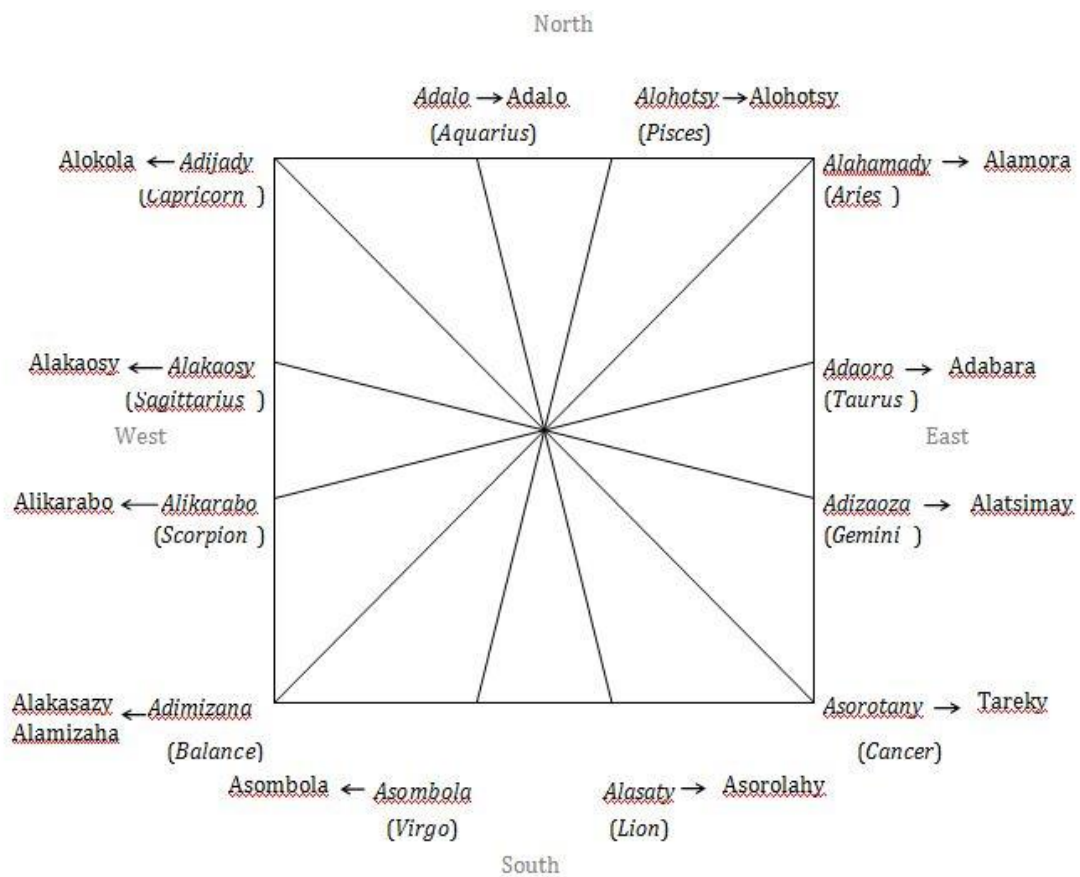
S ₁	S ₂	S ₃	S ₄
••	•	••	•
••	•	•	•
••	•	•	••
••	•	••	•
Asombola	Tareky	Alatsimay	Alakasazy

2.2. Zodiacal signs of sikidy figures

In Madagascar, the zodiacal signs are placed according to the cardinal orientations. The representation below (Figure 9) shows the link between the zodiac signs and sikidy mentioned in the previous subsection. (Decary Raymond, 1970)

Figure 9.

Orientation table



The zodiac signs (Figure 9) on the diagonals have three different names. The signs that are not on the diagonals have only two names. During exorcisms, the ombiasa often recites the twenty eight names. It is generally accepted that the figure alamora is of the sign alahamady, adabara : adaoro, alatsimay : adizaoza, taraiky : asorotany, alasady(alisaty), asombola(asombola), alikasazy(adimizana), alaizana (adimizana), alikarabo(alikarabo), alakaosy(alakaosy), alokola(adijady), adalo(adalo), alohotsy(alohotsy).

The figures karija, alibiavo, alikisy do not have zodiac signs. It can be seen that some figures of sikidy do not correspond to the assigned orientation. An abnormality?

The first day of alahamady(Aries) is called Asoroteny. The second day : Aliboteny, the third day : Esoré. The first day of Adaoro(Taurus) : Adabarà. The second day Alakà. Adizaoza(Gemini) : the first day : Elinà, the second day : Ezrà. Asorotany(Cancer) first day : Anasara, second day : Etafara, third day : Alibazà. Alahasaty(Lion) first day : Azobora, second day : Etafara. Asombola(Virgo) first day Alova, second day : Somaka. Adimizana(Balance) first day : Alikforo, second day : Alibimabana, third day : Anikilily. Alikarabo(Scorpion): first day : Kanibo, second day : Asora. Alakaosy(Sagittarius) : first day: Enemo, second day: Adibilahy. Adijady(Capricorn) first day : Sadabe, second day : Sadabolangy, third day : Sadasodika. Adalo(Aquarius) first day : Sakamadia, second day : Sadamakadamo. Alohotsy(Pisces) : first day : Lohomokarà, second day: faran'ny Makabia. Such an astrology is called lokaha in Madagascar (Decary Raymond, 1970).

3. FORMATION OF SIKIDY AND MATHEMATICAL RELATIONS

By the process mentioned above, we have the following table called mother sikidy (Anona F.M., 2016).

Figure 10.

Sikidy-mother table

$$\begin{array}{cccc}
 a_{14} & a_{13} & a_{12} & a_{11} \\
 a_{24} & a_{23} & a_{22} & a_{21} \\
 a_{34} & a_{33} & a_{32} & a_{31} \\
 a_{44} & a_{43} & a_{42} & a_{41}
 \end{array}$$

Each variable a_{ij} is composed of one seed or two seeds. The index i indicates the position

of the row, j that of the column, varying from 1 to 4, The reading of the figures of the mother-sikidy is from left to right, contrary to that of the usual matrix. The quadruplet $P_1 = (a_{11}, a_{21}, a_{31}, a_{41})$ denotes Talé (Consultant) ; $P_2 = (a_{12}, a_{22}, a_{32}, a_{42})$ Maly (Wealth) ; $P_3 = (a_{13}, a_{23}, a_{33}, a_{43})$ Fahatelo (Third person) ; $P_4 = (a_{14}, a_{24}, a_{34}, a_{44})$ Bilady (Earth) ; $P_5 = (a_{11}, a_{12}, a_{13}, a_{14})$ Fianahana (Child) ; $P_6 = (a_{21}, a_{22}, a_{23}, a_{24})$ Abily (Elderly or suffering person) ; $P_7 = (a_{31}, a_{32}, a_{33}, a_{34})$ Alisay (Woman) ; $P_8 = (a_{41}, a_{42}, a_{43}, a_{44})$ Fahavalo (Enemy). To have the table of descendants of the mother-sikidy (Figure 10), we make combinations:

one seed and one seed give two seeds ($\bullet + \bullet = \bullet\bullet$).

one seed and two seeds make one seed ($\bullet + \bullet\bullet = \bullet$).

two seeds and one seed become one seed ($\bullet\bullet + \bullet = \bullet$).

two seeds and two seeds imply two seeds ($\bullet\bullet + \bullet\bullet = \bullet\bullet$).

This is the law of the group $(\mathbb{Z}/2\mathbb{Z})$.

The other entities are obtained by combining the rows or columns of the mother sikidy mother table. The summation is on the quadruplet. Fahasivy (P_9 , ninth or talisman or even tear) = Alisay (P_7) + Fahavalo (P_8).

Haja (P_{11} , honor or food) = Fianahana (P_5) + Abily (P_6).

Asorita (P_{13} , spirits of the dead, or authorities) = Fahatelo (P_3) + Bilady (P_4).

L`alana (P_{15} , road) = Tale (P_1) + Maly (P_2).

Then we use the above results to have:

Ombiasa (P_{10} , diviner) = Fahasivy (P_9) + Haja (P_{11}).

Sely (P_{14} , people, or young man) = Asorita (P_{13}) + L`alana (P_{15}).

Aky (P_{12} , god) = Ombiasa (P_{10}) + Sely (P_{14}).

The last figure is:

Kiba (P_{16} , house) = Aky (P_{12}) + Tale (P_1).

Each column of the mother sikidy table can take 16 possibilities, but there are four columns.

Hence the Sikidy array number is $2^{16} = 65536$.

The interpretation of the combinations rather raises certain Malagasy mentalities.

This combination is not made at random, but it obeys a very precise rule. For example, the combination of P_1 and P_2 gives P_{15} (the consultant and wealth) paves the way for doing projects. The combinations are therefore based on a certain mentality.

Figure 11.

Example of a sikidy dabaray table

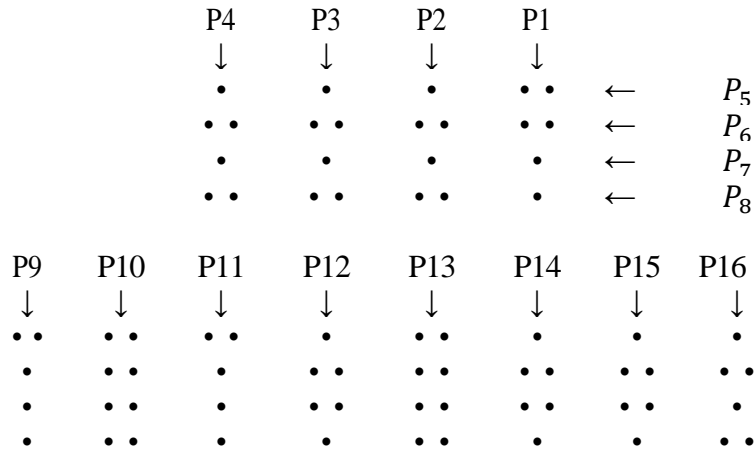
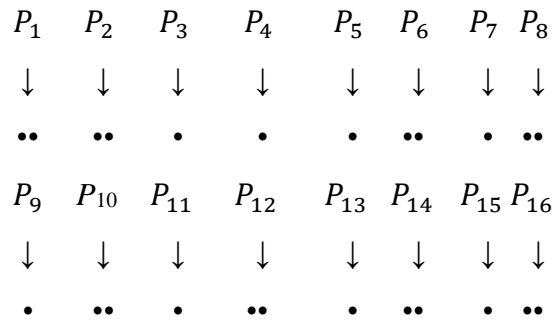


Figure 11. *Example of a sikidy dabaray table*

For the sikidy lavatehezana (Figure 12) (Decary Raymond, 1970), the same sikidy gives

Figure 12.

Example of a sikidy lavatehezana



P_1 is represented by ••, P_2 =••, P_3 =•, P_4 =•, P_5 =•, P_6 =••, P_7 =•, P_8 =••, P_9 =•, P_{10} =••, P_{11} =•, P_{12} =••, P_{13} =•, P_{14} =••, P_{15} =•, P_{16} =••. The names of P_i , $i \in [1,16]$ are identical to sikidy dabaray (Figure 11). We don't make any combinations. The remedies given by the ombiasa are only plants. For the use of the sikidy lavatehezana (Figure 12), a person is represented by only seed or two seeds, therefore not very explicit. Plants in Madagascar are named by their usage.

The ombiasa who use the sikidy dabaray (Figure 11) can take the images given by the

sikidy, by spreading seeds of sand or white clay collected in places considered sacred, on the figures given by the sikidy. They are made *into* remedies by combining them with appropriate plants.

A sikidy cannot be interpreted if the Aky (P_{12}) is not a prince, say the ombiasa. Taking the sum of all the elements of the Aky, we have: $\sum_{1 \leq i, j \leq 4} a_{ij}$. In fact, $1 \leq i, j \leq 4$, if it finds a slave on the Aky, there is a error combination.

4. PERCEPTION OF ODD OR EVEN NUMBER

For the sikidy, figures with an even number of seeds are considered as princes, figures with an odd number are slaves. It is forbidden for children in the southern region of Madagascar to give odd things. If he offers an odd numbered gift, he will complete for the next time to have an even number. Imparity (odd) is a few things to avoid, a few things imperfect and incomplete. Oddly enough, the association of imparity and indecency seems to have deep and universal roots. In French, in the expression "to commit an odd" means bad or bizarre action.

5. MYSTICAL RELATIONSHIPS OF SIKIDY SEEDS

Before the arrival of monotheistic religions, the Malagasy people are animists. Popular belief attributes forests, mountains, some seaside are inhabited by spirits of very old inhabitants that we no longer know the descendants. They are called "tsiny" in the northern region of Madagascar. In the high plateau region, it is rather called fasambazimba which translates as the cemetery of the "vazimba" (the first inhabitants of Madagascar). When preparing the seeds used for sikidy, there are rites to be performed respecting these corners from which the seeds for sikidy or sands are collected to make remedies.

6. INTERPRETATION OF FIGURES WITH THE MALAGASY CULTURAL PERCEPTION

Malagasy cultural perception on the figures of sikidy sometimes has a double meaning. If we take the alatsimay figure, which is the sign of a meeting. If the person is seriously

ill, it can mean a wake. The four outer seeds correspond to the four people who carry the stretcher to the tomb. Likewise for a healthy person, the adabara sign announces glory, success, and honor. For a seriously ill person, the sign announces the end. Because in Madagascar custom imposes respect and honor on the dead. The existence of a spiritual life after death seems rooted in Malagasy mentality.

7. THE FIGURES OF SIKIDY INTO

A figure of sikidy is *into* if this figure is the only one of its orientation group that appears in the places P_i , $i = 1, \dots, 16$. For example, an adabara *into* P_1 is particularly appreciated by an immigrant, conqueror or entrepreneur. You can have an *into* for one seat, two seats, ... etc. An anecdote tells that the first president of the Malagasy republic when he was young, in consultation with the ombiasa Mahavaly Daniel, made the eight adabara *into* appear. There are only six out of **65536!** Figures *into* are considered to be true meaning. During a consultation, if there is an *into*, the interpretation of the sikidy is centered on the *into*. We also consider the *into* on the two diagonals of the mother sikidy (Rabedimy Jean François, 1976). The first diagonal $(a_{11}, a_{22}, a_{33}, a_{44})$ bears the name lozam-borona which means poultry sacrifice, the second $(a_{14}, a_{23}, a_{32}, a_{41})$ lozan'omby (zebu sacrifice).

8. SOMES EXAMPLES OF TALISMAN

We are looking in vain for the advent of the appearance of an alohotsy *into* the P_{10} ombiasa in the South-West and South region of Madagascar. The West orientation group contains five figures. The calculation shows that alohotsy *into* ombiasa does not exist. We attribute this *into* to the greatest diviner. In fact the calculation shows that it does not exist. A talisman much appreciated by the ombiasa bears the name Ampelabe (literally a tall woman). We use seven *into* alimizaha at P_{10} (ombiasa). The talisman is in a zebu horn with a red fabric headband. The general accepted meaning for alimizaha is someone stubborn, in addition an *into* alimizaha at P_{10} is suitable for all orientations of sikidy signs used in Madagascar. The number seven corresponds to P_7 . Hence the name of a great woman. This talisman, it is believed, makes a divine woman appear in a dream who advises a patient on treatment. A talisman very appreciated by the divine in the south of

Madagascar is called Andriamarosivy (A prince who has a lot of Talisman). Among the ingredients used, there is *alasad* *into* at P_8 at the number 9, 9 *alasad* *into* at P_9 , 9 *alasad* *into* at P_{10} . Here are only 8 *alasad* *into* at P_9 . The diviner has found 6!

To admire the talismans used in Madagascar, the museum in Paris devoted to Malagasy arts gives the range. Most of the zebu horn objects are talismans. They are called in Madagascar Mohara.

It is generally accepted that a mohara which attracts wild snakes, wasps, are considered dangerous. A mohara that does not give any sign for a while is considered ineffective.

9. CONCLUSION

Sikidy is the art of divination which has its specificity. With the sikidy, we believe that we can bewitch or unencumber someone and make talismans. For some time, we have calculated all the sikidy in *into*. We used as currency of exchange with the ombiasa to obtain certain information. But we refused to write all the *into* in a book to avoid abuses of use. We met an ombiasa in a very remote corner in the south of Madagascar to whom we previously exchanged some information. After years, the ombiasa uses this *into* among the elements in a mohara to avoid rifle bullets. In southern Madagascar, zebu thieves challenge the authorities!

REFERENCES

- Anona Frédéric Manelo (2016). Mathematical Aspects of Sikidy, J. *Generalized Lie Theory Appl.* S2: 008.
- Decary Raymond (1970). *La divination Malgache par le Sikidy*, Publication du Centre Universitaire des Langues Orientales vivantes. 6ème Série IX Imprimerie Nationale. Librairie Orientaliste Paul Geuthner Paris, (pp.7-9).
- Rabedimy Jean François (1976). *Pratiques de divination à Madagascar, Technique du Sikidy en Pays Sakalava-Menabe*, TRAVAUX ET DE L'O.R.S.T.O.M N 51, O.R.S.T.O.M Paris, (pp. 136-140).