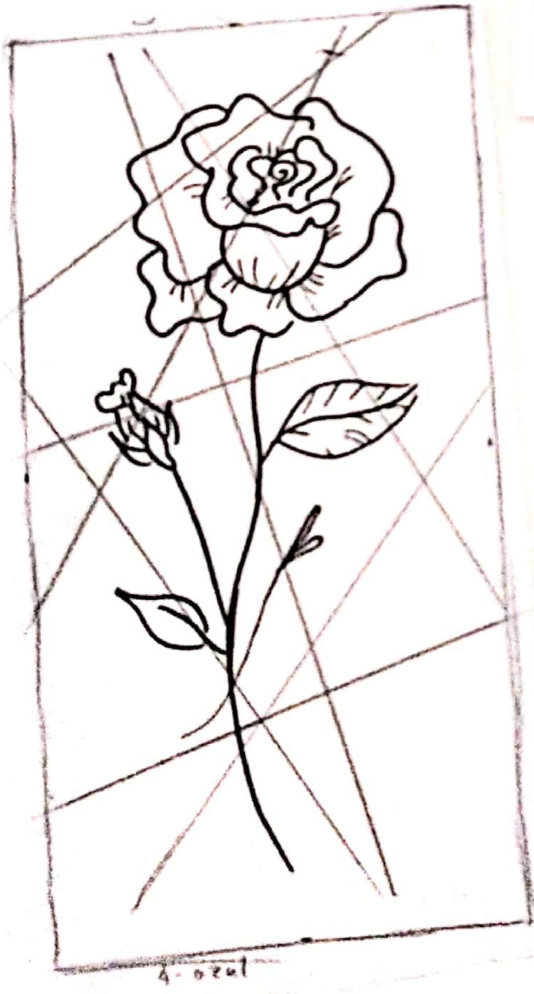
N-M-LUNA.GITHUB.IO

PORTAFOLIO

6-Brown

A sample of N. M. Luna's illustrations

7-negro

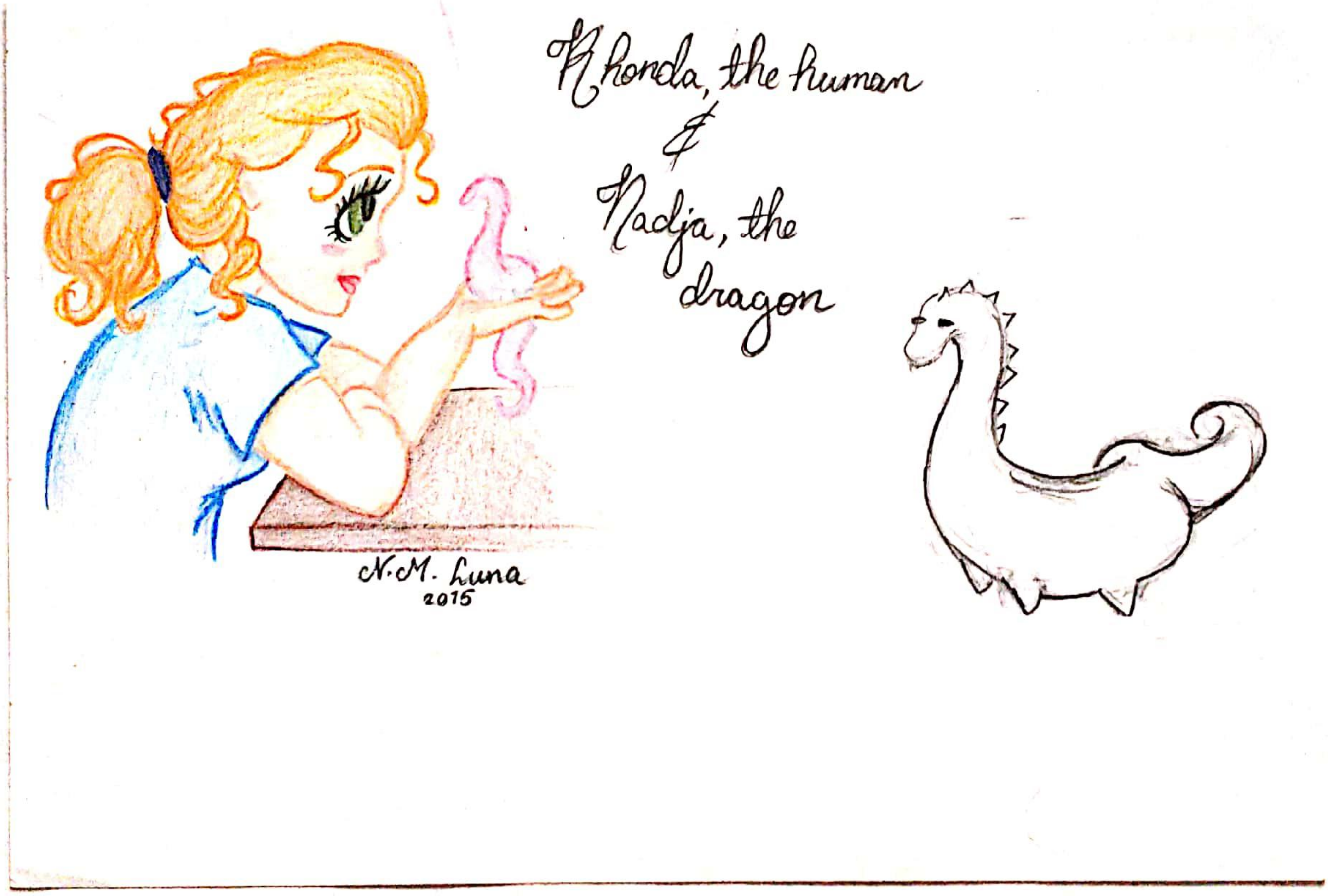


NAT.LUNA.54@GMAIL.COM

de Luna

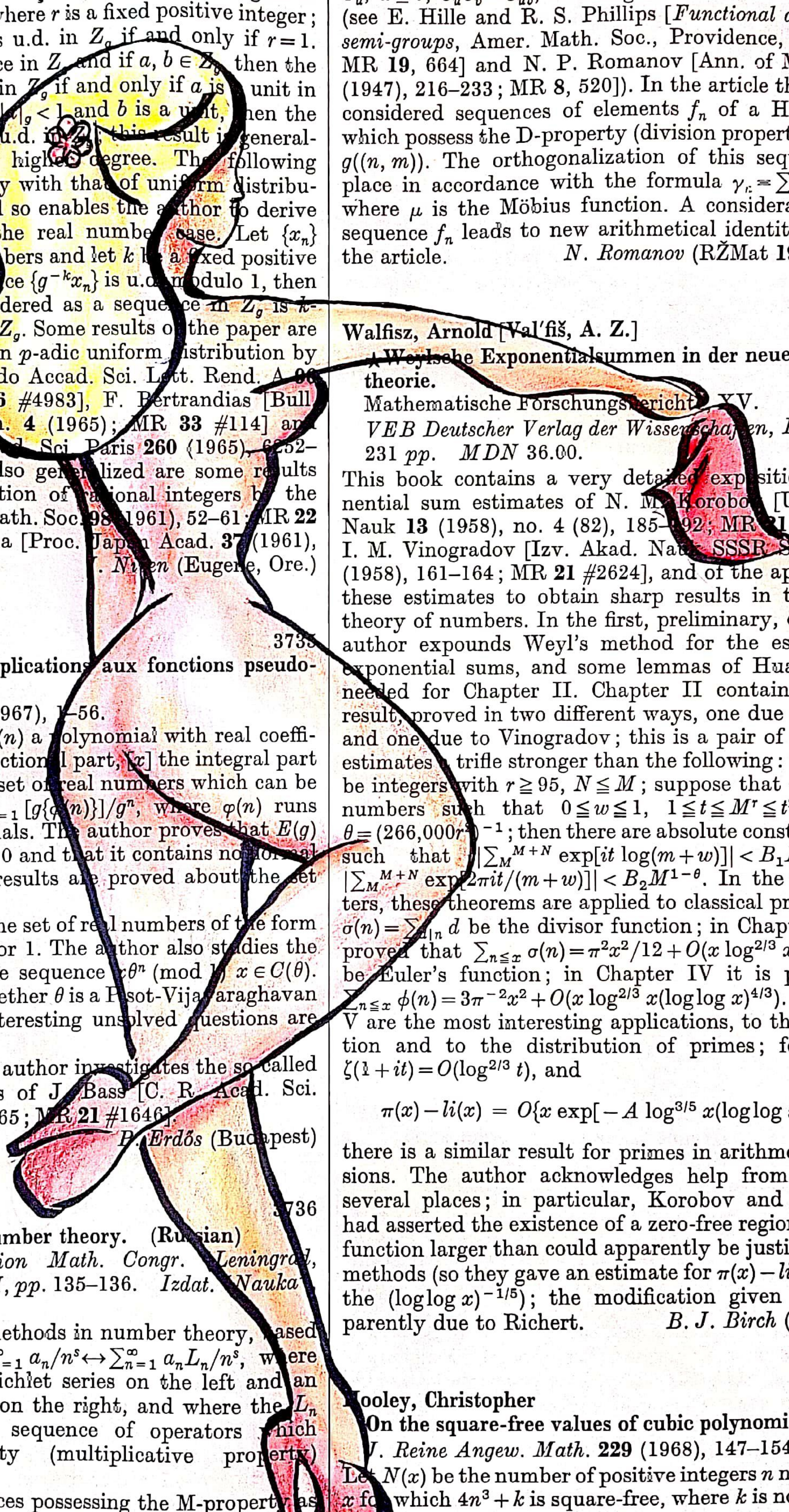

1 2 3 4 5 6 7 8 9 10 11
FUEGO
Luna
2021


Amorcito
PARAÍSO
Luna 2021
DRINK ME
Luna
THUG CHIC


Rhonda, the human
&
Nadja, the dragon
N.M. Luna
2015

Mush-brain

#4



$\{x_n\}$ is said to be uniformly distributed (u.d.) in Z_g if it is k-uniformly distributed in Z_g for all positive integers k. For example, let $x_n = n^r$, where r is a fixed positive integer; then the sequence $\{x_n\}$ is u.d. in Z_g if and only if $r=1$. If $\{x_n\}$ is any u.d. sequence in Z_g and if $a, b \in Z_g$, then the sequence $\{ax_n+b\}$ is u.d. in Z_g if and only if a is a unit in Z_g. If $a, b, c \in Z_g$, where $|a|_g < 1$ and b is a unit, then the sequence $\{an^2+bn+c\}$ is u.d. in Z_g; this result is generalized to polynomials of higher degree. The following result connects the theory with that of uniform distribution of real numbers, and so enables the author to derive many corollaries from the real number case. Let $\{x_n\}$ be a sequence of real numbers and let k be a fixed positive integer. If the real sequence $\{g^{-k}x_n\}$ is u.d. modulo 1, then the sequence $\{[x_n]\}$ considered as a sequence in Z_g is k-uniformly distributed in Z_g. Some results of the paper are generalizations of work on p-adic uniform distribution by M. Cugiani [Ist. Lombardo Accad. Sci. Lett. Rend. A **96** (1962), 351–372; MR **26** #4983], F. Bertrandias [Bull. Soc. Math. France Mém. **4** (1965); MR **33** #114] and J. Chauvineau [C. R. Acad. Sci. Paris **260** (1965), 6252–6255; MR **31** #3400]. Also generalized are some results on the uniform distribution of rational integers by the reviewer [Trans. Amer. Math. Soc. **98** (1961), 52–61; MR **22** #10971] and S. Uchiyama [Proc. Japan Acad. **37** (1961), 605–609; MR **25** #1145].

I. Niven (Eugene, Ore.)

Mendes France, Michel 3735

Nombres normaux. Applications aux fonctions pseudo-aléatoires.

J. Analyse Math. **20** (1967), 1–56.

Let $g \geqq 2$ be an integer, $\varphi(n)$ a polynomial with real coefficients. $\{x\}$ denotes the fractional part, $[x]$ the integral part of x. Denote by $E(g)$ the set of real numbers which can be written in the form $\sum_{n=1}^{\infty} [g\{\varphi(n)\}]/g^n$, where $\varphi(n)$ runs through all real polynomials. The author proves that $E(g)$ has Hausdorff dimension 0 and that it contains no normal numbers. Several other results are proved about the set $E(g)$.

Let $\theta > 2$. Let $C(\theta)$ be the set of real numbers of the form $(\theta-1)\sum_{n=1}^{\infty} \varepsilon_n/\theta^n$, $\varepsilon_n = 0$ or 1. The author also studies the distribution mod 1 of the sequence $x\theta^n$ (mod 1), $x \in C(\theta)$. The results depend on whether θ is a Pisot-Vijayaraghavan number or not. Some interesting unsolved questions are raised.

In the last chapter the author investigates the so-called pseudo-random functions of J. Bass [C. R. Acad. Sci. Paris **247** (1958), 1163–1165; MR **21** #1646].

P. Erdős (Budapest)

Romanov, N. P. 3736

Operator methods in number theory. (Russian)

Proc. Fourth All-Union Math. Congr. (Leningrad, 1961) (*Russian*), *Vol. II*, *pp.* 135–136. *Izdat. "Nauka", Leningrad*, 1964.

One considers operator methods in number theory, based on the isomorphism $\sum_{n=1}^{\infty} a_n/n^s \leftrightarrow \sum_{n=1}^{\infty} a_n L_n/n^s$, where there is an ordinary Dirichlet series on the left and an operator Dirichlet series on the right, and where the L_n $(n=1,2,3,\cdots)$ form a sequence of operators which possess the M-property (multiplicative property) $L_n L_m = L_{nm}$.

One can obtain sequences possessing the M-property as particular values of a one-parameter operator group $\mathfrak{C}_u$, $u \geqq 0$, $\mathfrak{C}_u\mathfrak{C}_v = \mathfrak{C}_{uv}$, for integral values of the parameter (see E. Hille and R. S. Phillips [*Functional analysis and semi-groups*, Amer. Math. Soc., Providence, R.I., 1957; MR **19**, 664] and N. P. Romanov [Ann. of Math. (2) **48** (1947), 216–233; MR **8**, 520]). In the article there are also considered sequences of elements f_n of a Hilbert space which possess the D-property (division property) $(f_n, f_m) = g((n, m))$. The orthogonalization of this sequence takes place in accordance with the formula $\gamma_n = \sum_{d|n} \mu(n/d) f_d$, where μ is the Möbius function. A consideration of the sequence f_n leads to new arithmetical identities, cited in the article.

N. Romanov (RŽMat **1965** #8 A95)

Walfisz, Arnold [Val'fiš, A. Z.] 3737

Weylsche Exponentialsummen in der neueren Zahlentheorie.

Mathematische Forschungsberichte, XV.

VEB Deutscher Verlag der Wissenschaften, Berlin, 1963. 231 *pp.* *MDN* 36.00.

This book contains a very detailed exposition of exponential sum estimates of N. M. Korobov [Uspehi Mat. Nauk **13** (1958), no. 4 (82), 185–192; MR **21** #4939] and I. M. Vinogradov [Izv. Akad. Nauk SSSR Ser. Mat. **22** (1958), 161–164; MR **21** #2624], and of the application of these estimates to obtain sharp results in the analytic theory of numbers. In the first, preliminary, chapter, the author expounds Weyl's method for the estimation of exponential sums, and some lemmas of Hua which are needed for Chapter II. Chapter II contains the main result, proved in two different ways, one due to Korobov and one due to Vinogradov; this is a pair of exponential estimates a trifle stronger than the following: Let r, M, N be integers with $r \geqq 95$, $N \leqq M$; suppose that w, t are real numbers such that $0 \leqq w \leqq 1$, $1 \leqq t \leqq M^r \leqq t^{21/10}$; write $\theta = (266{,}000r^2)^{-1}$; then there are absolute constants B_1, B_2 such that $|\sum_M^{M+N} \exp[it\log(m+w)]| < B_1 M^{1-\theta}$, and $|\sum_M^{M+N} \exp[2\pi it/(m+w)]| < B_2 M^{1-\theta}$. In the later chapters, these theorems are applied to classical problems. Let $\sigma(n) = \sum_{d|n} d$ be the divisor function; in Chapter III, it is proved that $\sum_{n\leq x} \sigma(n) = \pi^2 x^2/12 + O(x \log^{2/3} x)$. Let $\phi(n)$ be Euler's function; in Chapter IV it is proved that $\sum_{n\leq x} \phi(n) = 3\pi^{-2}x^2 + O(x\log^{2/3} x(\log\log x)^{4/3})$. In Chapter V are the most interesting applications, to the zeta function and to the distribution of primes; for instance, $\zeta(1+it) = O(\log^{2/3} t)$, and

$$\pi(x) - li(x) = O\{x \exp[-A \log^{3/5} x(\log\log x)^{-1/5}]\};$$

there is a similar result for primes in arithmetic progressions. The author acknowledges help from Richert in several places; in particular, Korobov and Vinogradov had asserted the existence of a zero-free region of the zeta function larger than could apparently be justified by their methods (so they gave an estimate for $\pi(x) - li(x)$ omitting the $(\log\log x)^{-1/5}$); the modification given here is apparently due to Richert.

B. J. Birch (Manchester)

Hooley, Christopher 3738

On the square-free values of cubic polynomials.

J. Reine Angew. Math. **229** (1968), 147–154.

Let $N(x)$ be the number of positive integers n not exceeding x for which $4n^3+k$ is square-free, where k is not a multiple

#3

Suffel, C. L. 3801

On the triangular form of a linear transformation.

Amer. Math. Monthly **74** (1967), 1236–1237.

Ballantine, C. S. 3802

Products of positive definite matrices. II.

Pacific J. Math. **24** (1968), 7–17.

Author's introduction: "This paper is concerned with the problem of determining, for given positive integers n and j, which $n \times n$ matrices (of positive determinant) can be written as a product of j positive definite matrices. In § 2 the 2×2 complex case is completely solved. In particular, it turns out that every 2×2 complex matrix of positive determinant can be factored into a product of five positive definite Hermitian matrices and, unless it is a negative scalar matrix, can even be written as a product of four positive definite matrices. Sections 3 and 4 deal with the general $n \times n$ case. In § 3 it is shown that a scalar matrix λI can be written as a product of four positive definite Hermitian matrices only if the scalar λ is real and positive, and that λH (λ complex, H Hermitian) can be written as a product of three positive definite matrices only if λH is itself positive definite. In § 4 it is shown that every $n \times n$ real matrix of positive determinant can be written as a product of six positive definite real symmetric matrices and that every $n \times n$ complex matrix of positive determinant can be written as a product of eleven positive definite Hermitian matrices."

{Part I appeared in same J. **23** (1967), 427–433 [MR **36** #2635].} *T.-S. Wu* (Cleveland, Ohio)

Erdos, J. A. 3803

On products of idempotent matrices.

Glasgow Math. J. **8** (1967), 118–122.

J. M. Howie [J. London Math. Soc. **41** (1966), 707–716; MR **36** #2728] has shown that every transformation of a finite set which is not a permutation can be written as a product of idempotents. In this paper the above mentioned result is generalized to obtain the following very interesting theorem: Every singular square matrix can be written as a product of idempotent matrices.

The author proves the theorem for matrices with elements from an arbitrary field using the rational canonical form. An alternate proof is given for the case of an algebraically closed field, over which every matrix is similar to a triangular matrix. There is a misprint in case (i) of this proof. The given matrix F is not idempotent, but is a product of idempotent matrices,

$$F = \begin{bmatrix} 0 & Z & \lambda+\alpha \\ 0 & I & Y \\ 0 & 0 & 0 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 0 & I & Y \\ 0 & 0 & 0 \end{bmatrix} \begin{bmatrix} 0 & Z & \lambda+\alpha \\ 0 & I & 0 \\ 0 & 0 & 1 \end{bmatrix}.$$

C. G. Cullen (Pittsburgh, Pa.)

Menon, M. V. 3804

Matrix links, an extremization problem, and the reduction of a non-negative matrix to one with prescribed row and column sums.

Canad. J. Math. **20** (1968), 225–232.

Let ρ_i, σ_j be the row-sums and column-sums for a finite matrix A. If A has a specified pattern of positions of its nonzero elements and specified values of ρ_i $(i > 1)$ and of σ_j $(j > 1)$, a procedure is described for evaluating $\sup\{\rho_1\}$ and $\sup\{\sigma_1\}$.

The problem is also studied of expressing an arbitrary finite non-negative matrix $\tilde{A}$ in the form UAV, where U and V are diagonal matrices and A is a non-negative matrix with prescribed ρ_i and σ_j.

J. G. Mauldon (Oxford)

Stein, Philip; Pfeffer, Allen 3805

On the ranges of two functions of positive definite matrices. II.

ICC Bull. **6** (1967), 81–86.

In this paper the ranges of $H - E^*HE$ and $BH + HB^*$ are characterized, where H runs through all positive definite matrices, E runs through all matrices similar to a fixed convergent matrix C, and B runs through all matrices similar to a fixed stable matrix A. (Here E^* denotes the complex conjugate transpose of E, C is convergent if $\lim_{n \to \infty} C^n = 0$, and A is stable if all characteristic roots of A have negative real part.) In the previous paper [the first author, J. Algebra **2** (1965), 350–353; MR **32** #7579] the ranges of $H - C^*HC$ and of $AH + HA^*$ were found, without constraining convergent C or stable A. In recent years a large number of investigations of stable matrices have appeared. In addition to the three references listed in this article, a list of 29 references is given in a paper of H. Schneider [Numer. Math. **7** (1965), 11–17; MR **30** #3888]. Another related paper is that of R. Redheffer [J. Algebra **2** (1965), 42–47; MR **32** #1210].

R. C. Thompson (Santa Barbara, Calif.)

Taussky, Olga 3806

Positive-definite matrices.

Inequalities (Proc. Sympos. Wright-Patterson Air Force Base, Ohio, 1965), pp. 309–319. Academic Press, New York, 1967.

After a survey of various results on matrices with positive elements and positive definite matrices, the author remarks that E. Calabi [Proc. Amer. Math. Soc. **15** (1964), 844–846; MR **29** #3480] has shown that if A and B are real symmetric matrices of order greater than 2, the necessary condition (*) $x'Ax = x'Bx = 0$ implies $x = 0$ for the existence of a positive definite matrix in the pencil $\lambda A + uB$ is also sufficient. Greub and Milnor [see W. H. Greub, *Linear algebra*, Springer, Berlin, 1958; MR **20** #3883; second edition, Academic Press, New York, 1963; MR **28** #1201] showed that under condition (*), A and B can be transformed to diagonal form simultaneously. Using a theorem of E. Stiemke [Math. Ann. **76** (1915), 340–342], the author proves that Calabi's theorem follows from that of Greub and Milnor.

There is also a discussion of other results including Ljapunov's theorem concerning $AG + GA^*$ and the solutions, G, of $AG + GA^* = -I$.

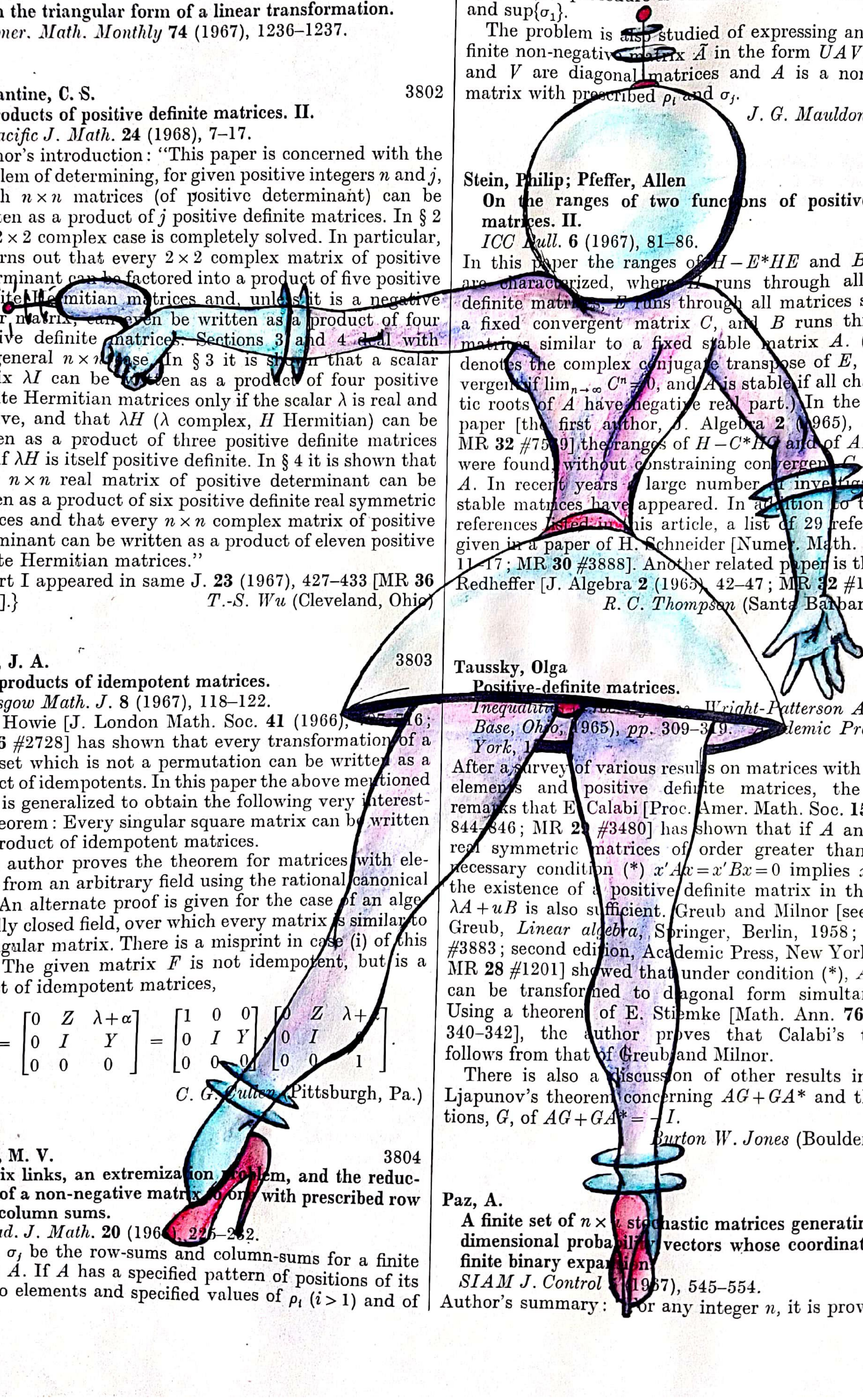
Burton W. Jones (Boulder, Colo.)

Paz, A. 3807

A finite set of $n \times n$ stochastic matrices generating all n-dimensional probability vectors whose coordinates have finite binary expansion.

SIAM J. Control **5** (1967), 545–554.

Author's summary: For any integer n, it is proved that

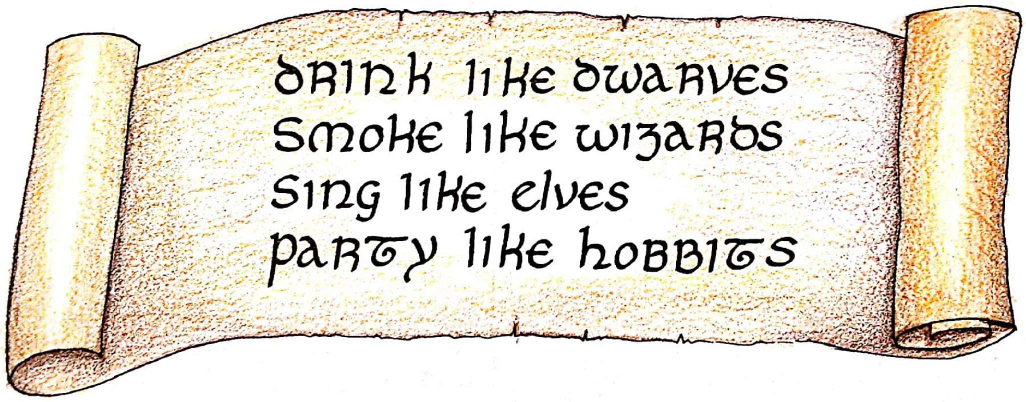


Burlesque Babe, 2019
INK + WATERCOLOR
AMS Math. Rev., Vol. 36, No. 4, 1968

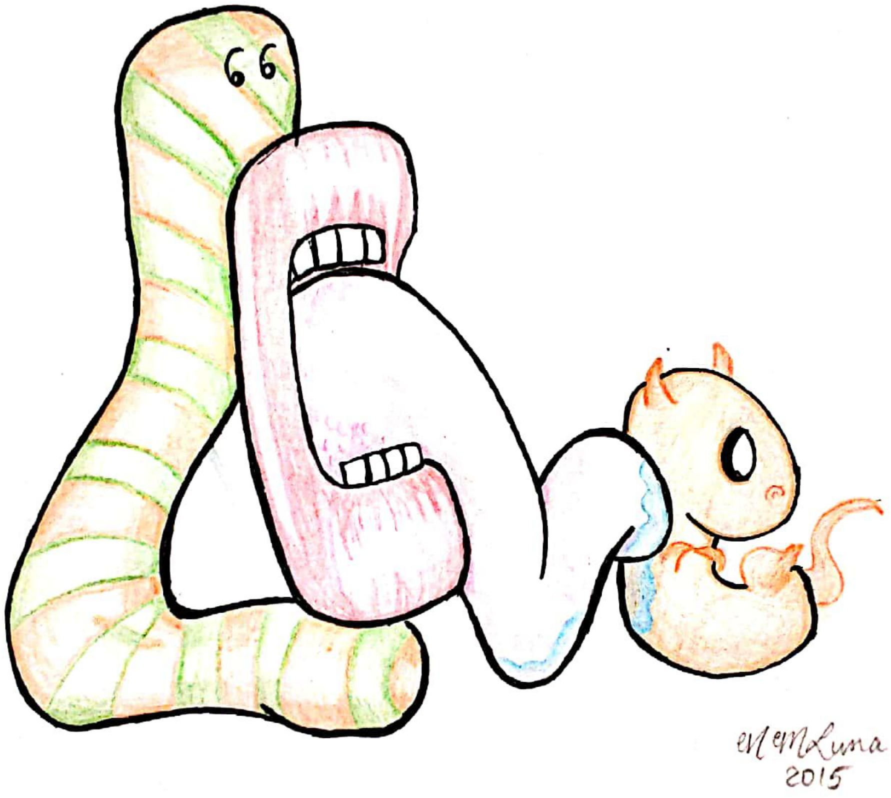
Luna

SPACE BABE, 2019
INK + WATERCOLOR
AMS Math. Rev., Vol. 36, No. 4, 1968

Luna

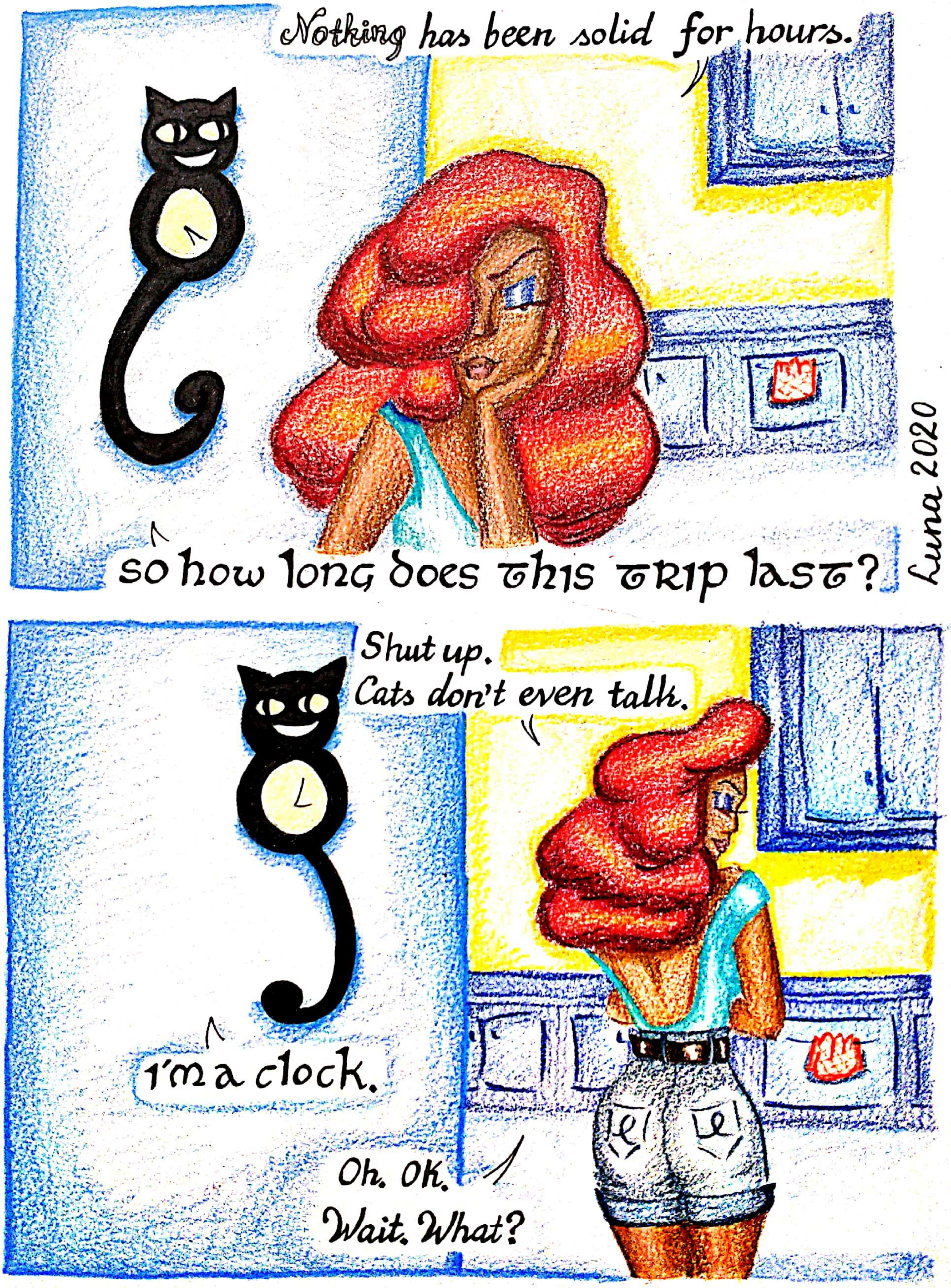

drink like dwarves
smoke like wizards
sing like elves
party like hobbits

Luna 2020



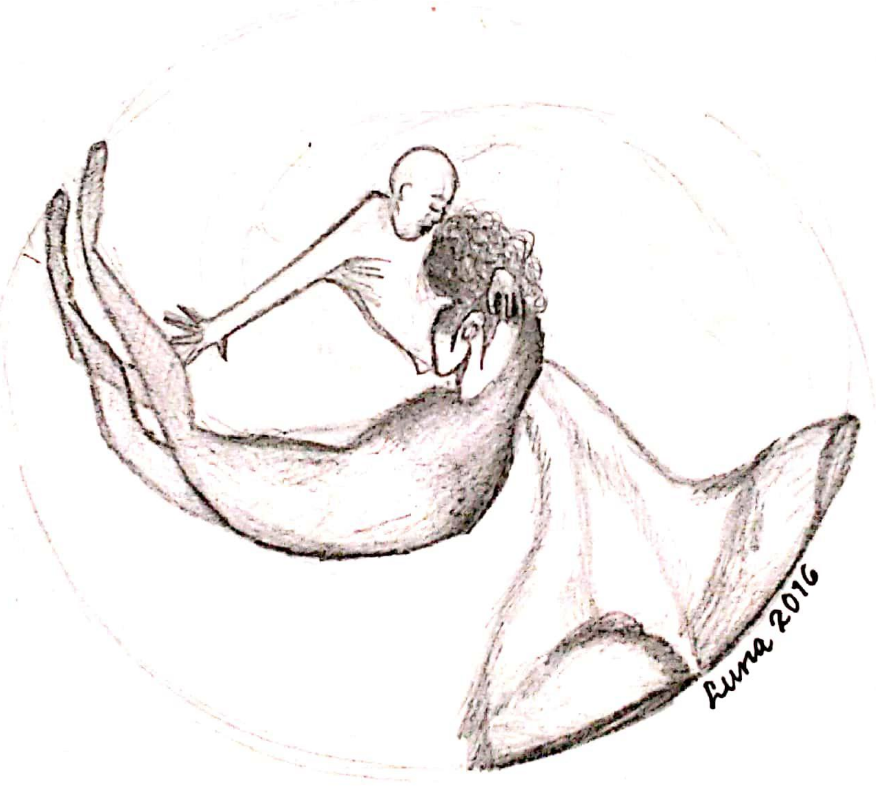
MMLuna
2015

Scanned with CamScanner


Nothing has been solid for hours.
so how long does this trip last?
Luna 2020
Shut up.
Cats don't even talk.
I'm a clock.
Oh. OK.
Wait. What?

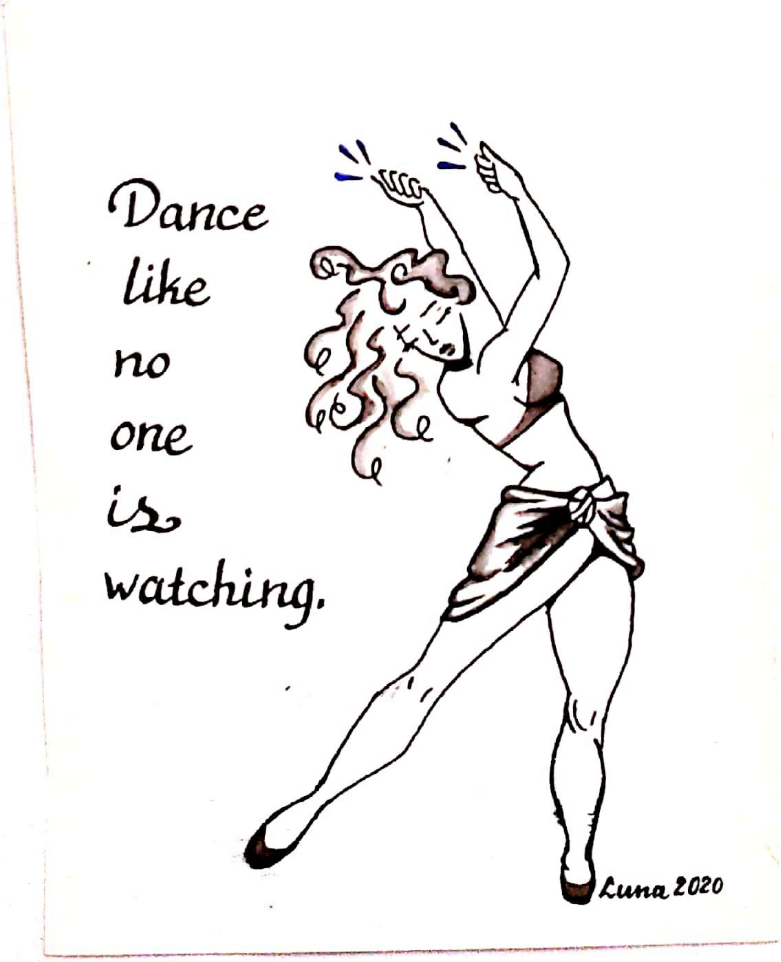
LSD0320


G'morning!
Morning, professor!
MATHEMATI
STATISTICAL SCIENCES
Mmm... Lotta work today.
Papers to grade and--
DR. KRONHOLM
huh?!
...not again...
N.M. Luna

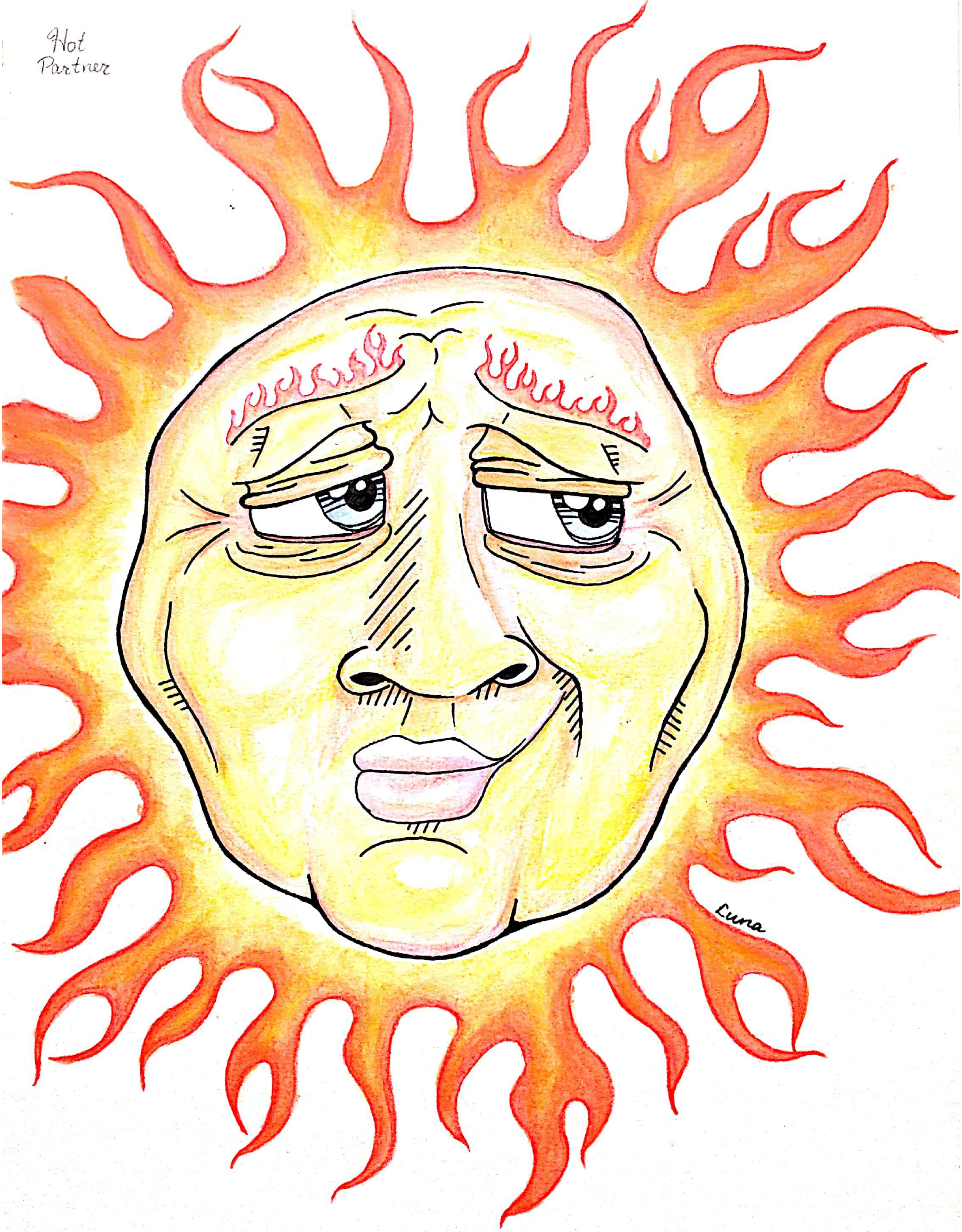

Luna 2016

Food-gasm


El tintero
titilante
Luna 2019


Dance
like
no
one
is
watching.
Luna 2020

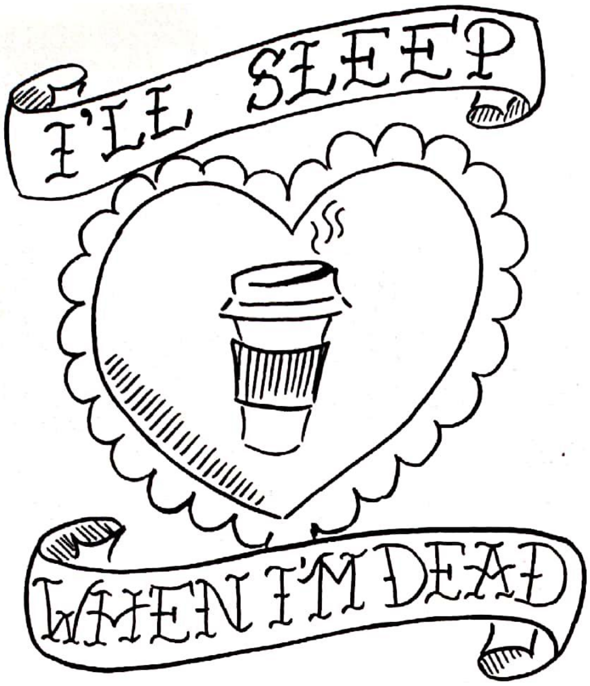
Hot Partner

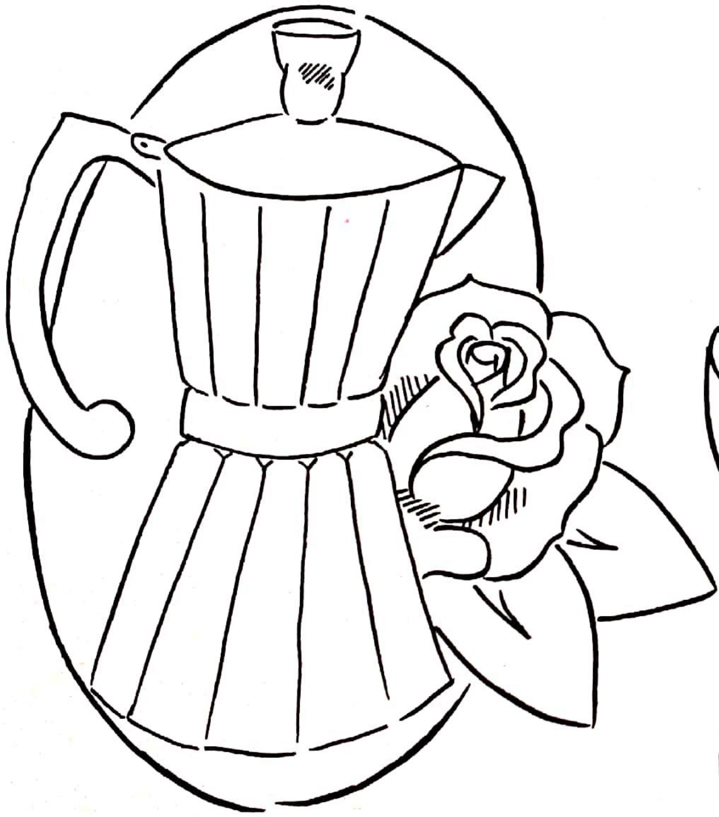


N.M. Luna 2020

Cold
Partner

N. M. Luna 2020

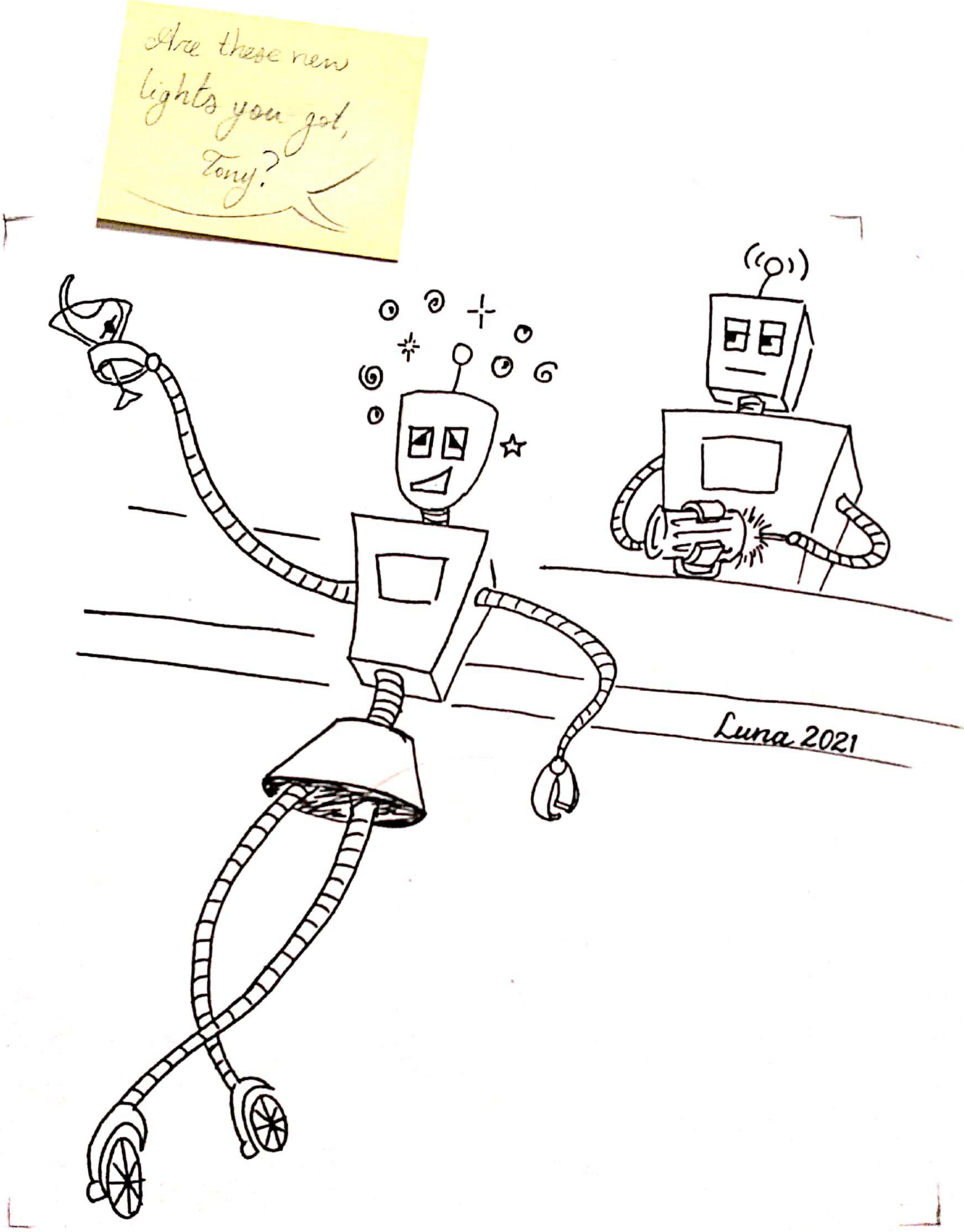




Coffee Fiend

Pluma y tintero

N.M. Luna 2020


Are these new lights you got, Tony?
Luna 2021

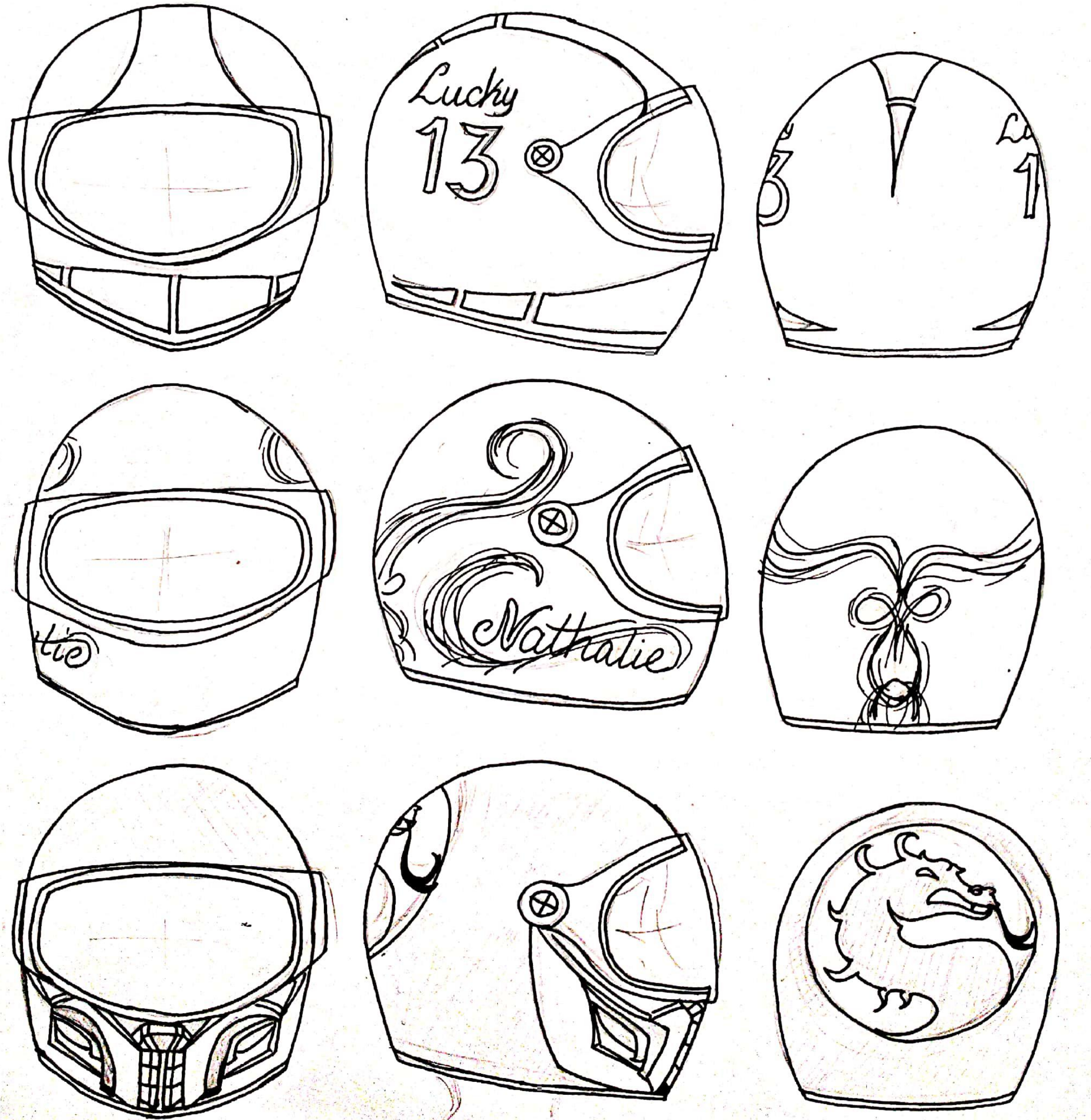
The mis-Adventures of Charlie Hex

by N. M. Luna

7mm lines
3mm gap

Charlie is a self-liberated
automaton who travels the
X15-β galaxy in her monopod
cruiser, running from the
Intergalactic Law Enforcement
Agency and tracking down
bounty whose rewards fund
her barroom shenanigans and
romantic escapades.

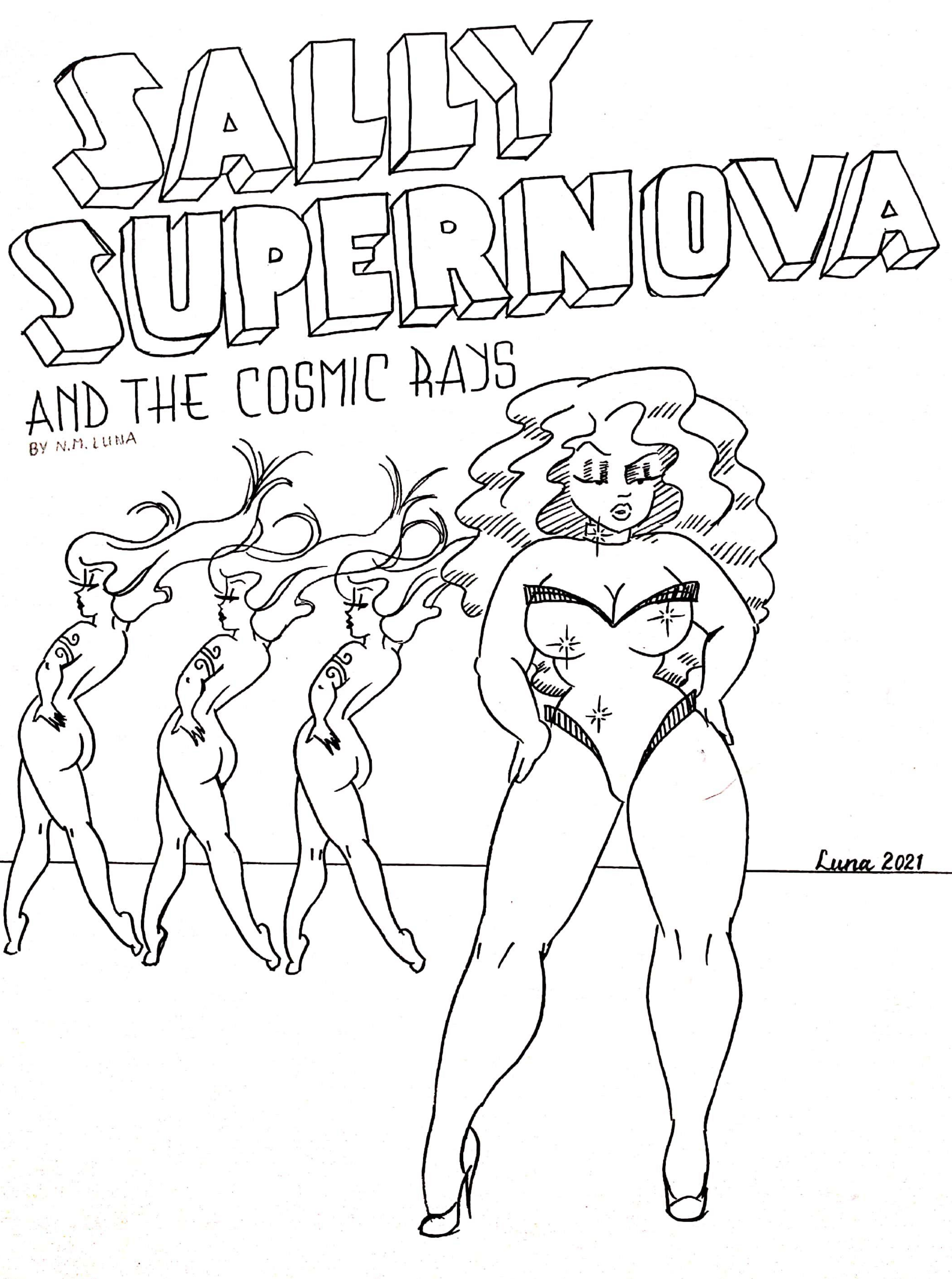
Biltwell Gringo S Skins



N. M. Luna 2021

Biltwell Gringo S Skins

N. M. Luna 2021

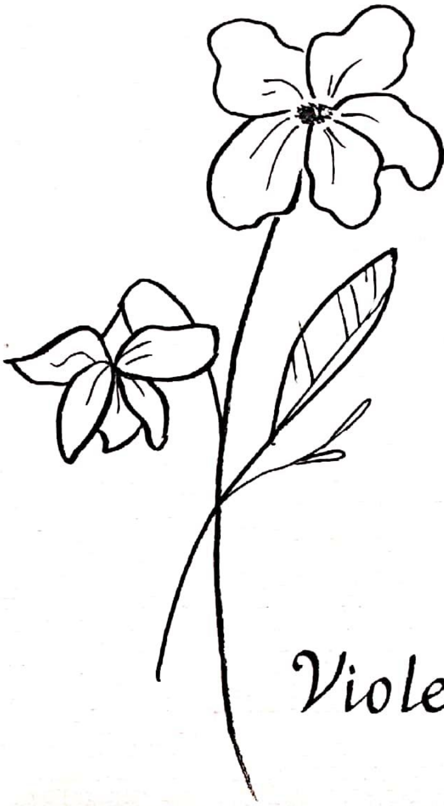

SALLY SUPERNOVA
AND THE COSMIC RAYS
BY N.M. LUNA
Luna 2021

Unamused Cuties

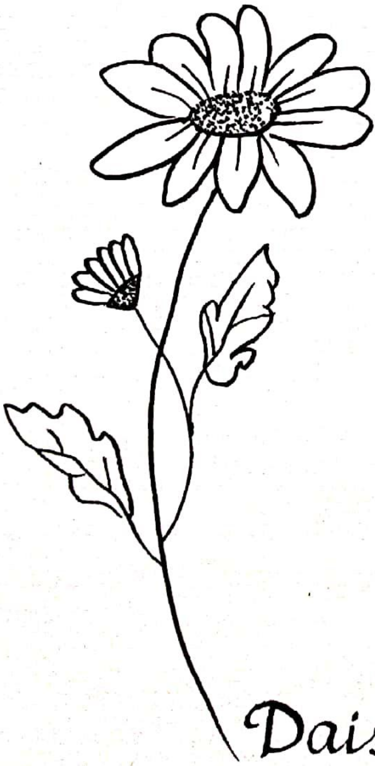
N. M. Luna 2021

A study in bloom

Snow Drop



Violet

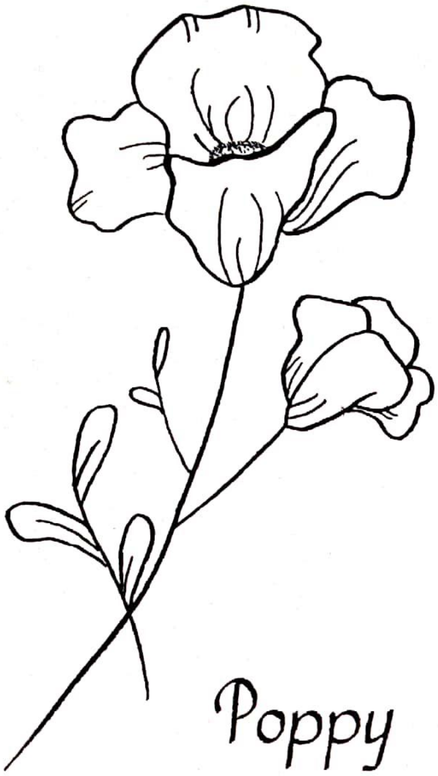


Daisy

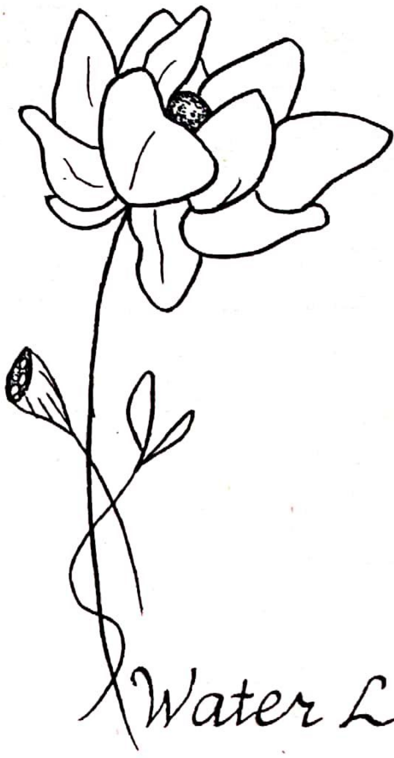
Daffodil

N. M. Luna 2021

A study in Bloom



Poppy



Water Lily

Rose

Lily of the Valley

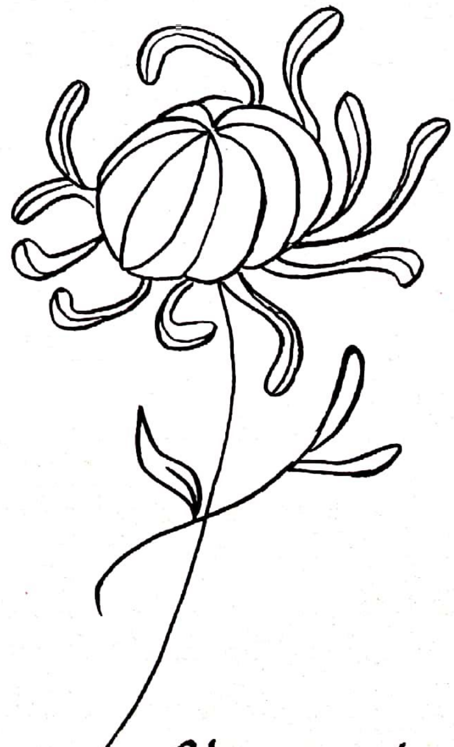
N. M. Luna 2021

A study in Bloom

Cosmos

Morning Glory

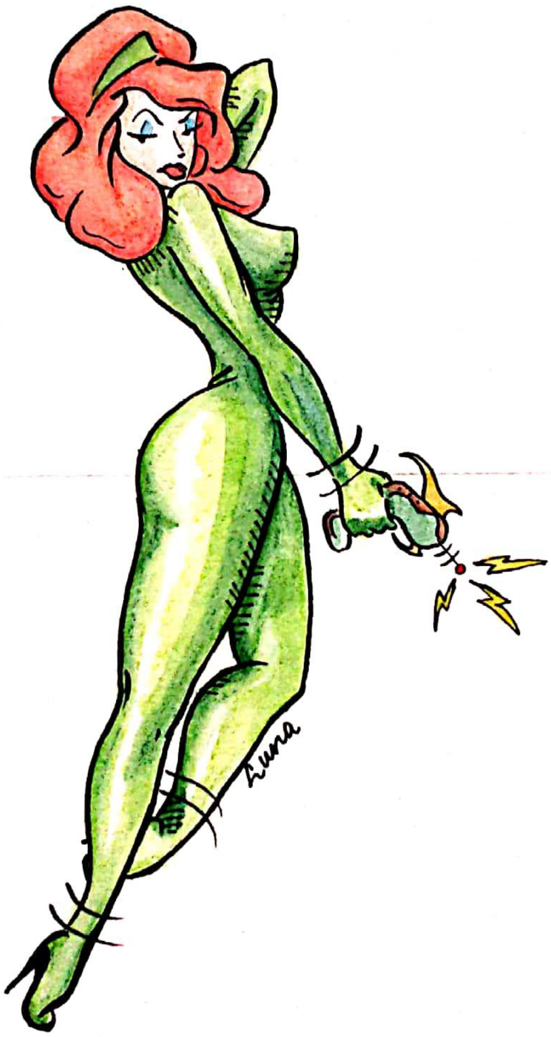
Narsissus



Chrysenthemum

N. M. Luna 2021

Space Babe
(Daphne)



N. M. Luna 2021

Space Babe
(Velma)

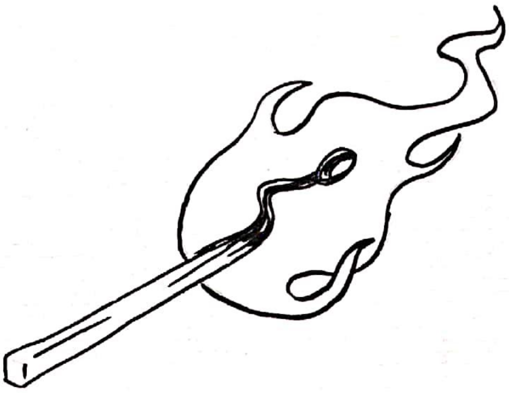
N.M. Luna 2021

Daphne and Velma
travel to the 31^{st} century!

They catch crooks and
solve mysteries
in the future, where
dogs have been replaced
by monkeys in spacesuits
-Good bye, Scooby!-
and Velma has programmed
two automatons
with a simple algorithm
to replace
Fred and Shaggy.

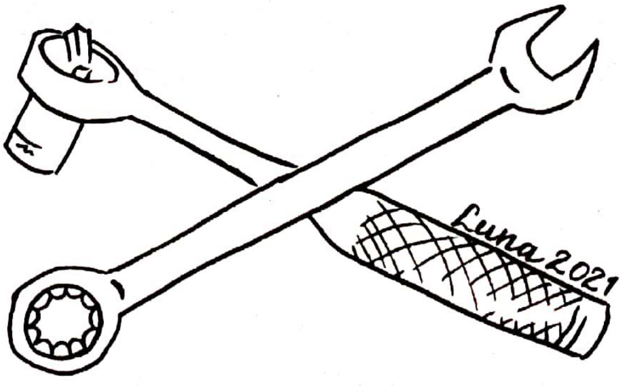
-N.M. Luna

Throat Punch

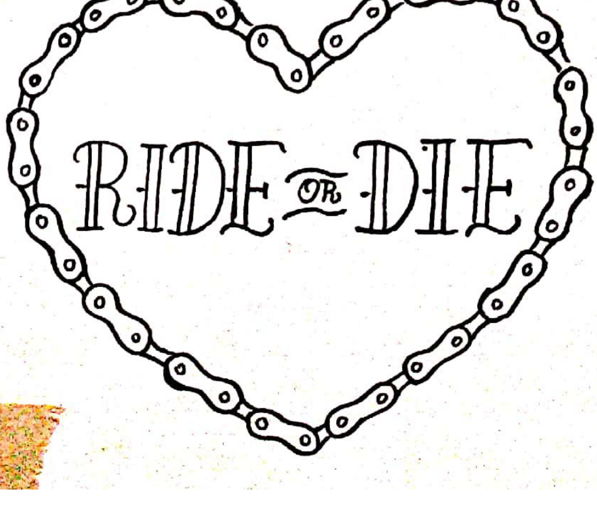


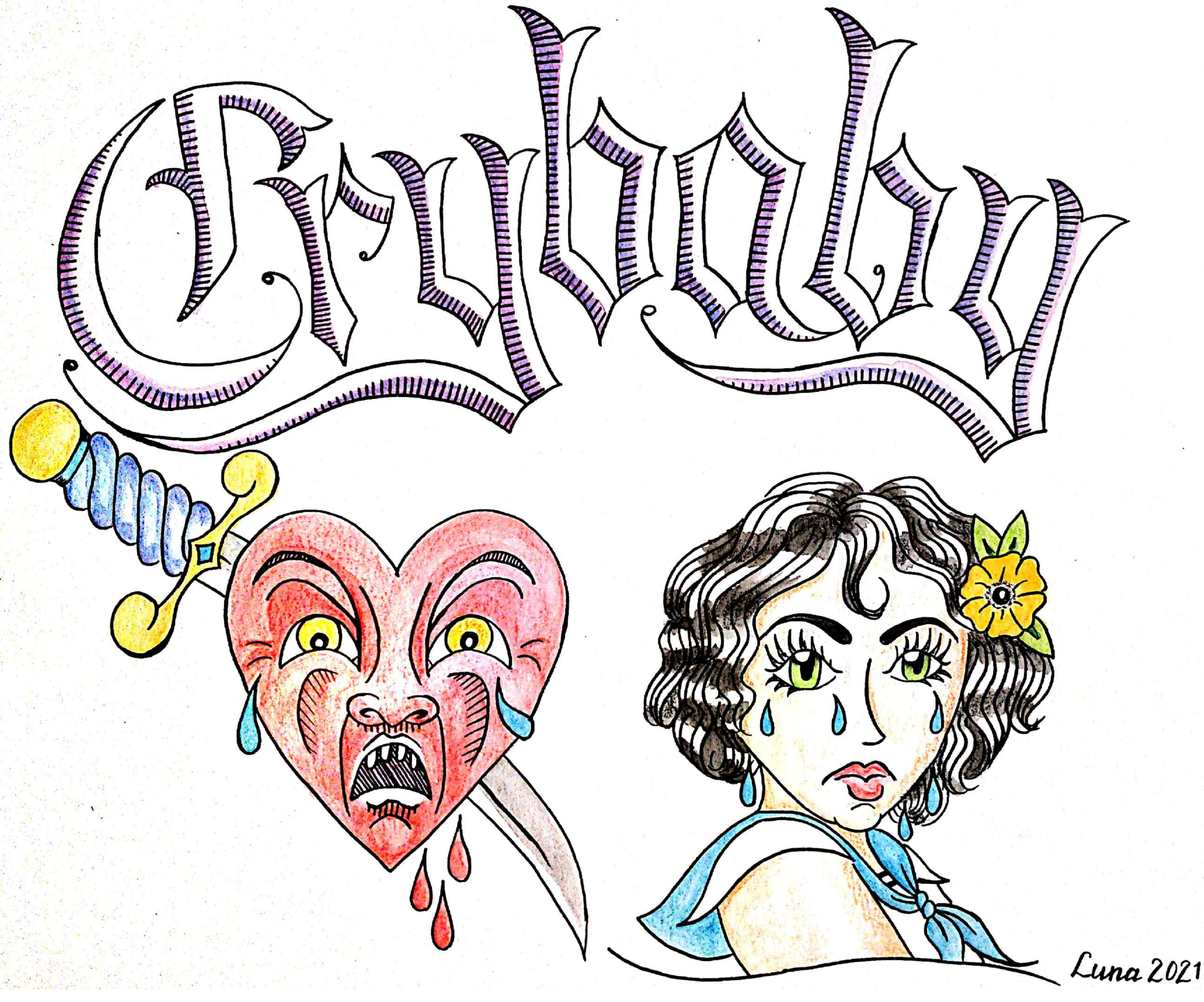
HELL
RAISER

I'M GOING
STRAIGHT
TO HELL



JUST LIKE
MY MAMA
SAID

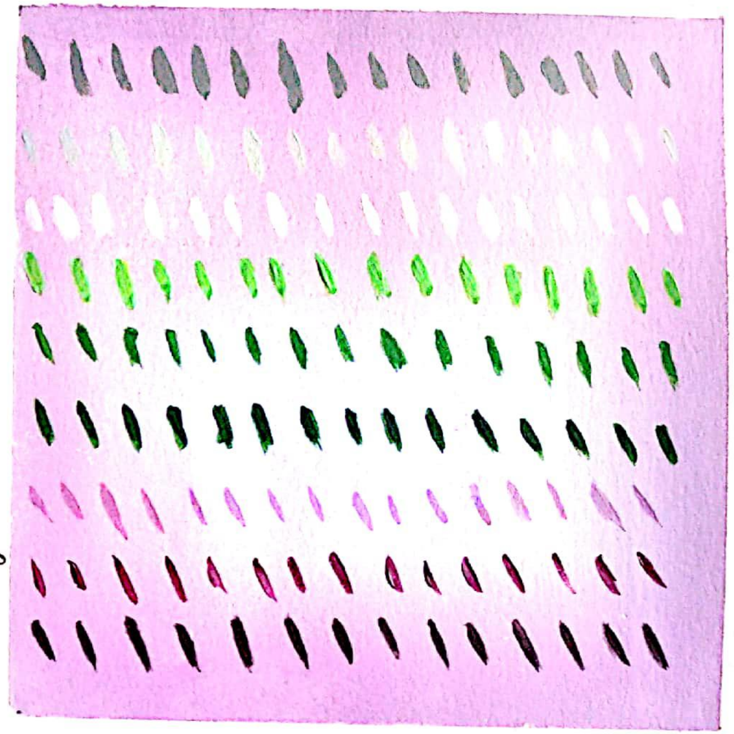



Crybaby
Luna 2021


Amorcito
PARAÍSO
Luna
Luna 2021
DRINK ME
MAMA

Luna

verano



Luna

Primavera

Otoño

Luna

Invierno

Luna