

“Juliet is the Sun”: The Secret Anti-Coal Play in Shakespeare’s *Romeo and Juliet* and the Cosmic Heliocentrism of Giordano Bruno

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Summary

The first line and second lines of *Romeo and Juliet* (“Gregory, on my word, we’ll not carry coals”/ “No for then we should be colliers) can be seen, because of their prominence as the introductory lines, as a hidden announcement of the theme of the play. The London of Shakespeare’s era saw huge increases in coal consumption as forests could no longer provide enough fuel for a booming economy and population. The famous line “Juliet is the sun” then becomes (in the same context of a secret code) a way to attach allegorical and cosmic significance to the heroine. Shakespeare concealed a “secret” morality play in four ontologically delineated scenes between the lovers (who interact functionally only with each other when they are together), with Romeo as an Everyman who leaves the sun economy (the set of flows of matter and energy to humans) and lives in prolonged exile from the sun economy before returning upon the future depletion of fossil fuels. The cosmic order is finally heliocentric (with the sun as the only permanent and stable source of sustenance and wherewithal, what we now call energy) and the science behind the idea is based on the work of Giordano Bruno, the natural philosopher later executed in 1600 for heresy by the Inquisition.

The historian of Renaissance philosophy Dame Frances Yates, when she wrote *Giordano and the Hermetic Tradition* in 1964, called for fresh thinking about Giordano Bruno’s possible influence on William Shakespeare’s work:

An entirely new approach to the problem of Bruno and Shakespeare will have to be made. The problem goes very deep and must include the study in relation to Bruno, of Shakespeare’s profound preoccupation with significant language, language which

“captures the voices of the gods”---to use one of Bruno’s marvelous expressions---as contrasted with pedantic or empty use of language. Shakespeare’s imagination is full of magic, which often seems to become a vehicle for imaginative solutions of the world’s problems. Was it not Shakespeare who created Prospero, the immortal portrait of the benevolent Magus, establishing the ideal state? How much does Shakespeare’s conception of the role of the Magus owe to Bruno’s reformulation of that role in relation to the miseries of the times? (Yates GBHT 391-2)

In 1975, Yates published a book called *Majesty and Magic in Shakespeare’s Last Plays*. This book does not include much discussion of Giordano Bruno, (in fact, Yates admits in the introduction, “the time for writing a book on ‘Shakespeare and the Hermetic Tradition’ (has not yet) come”(Yates MMS 3)) but in one passage in this book, she writes:

The return of Hermetic or ‘Egyptian’ magical religion involves, in the Hermetic texts and in Giordano Bruno’s interpretation of them, the return of moral law, the banishment of vice, the renewal of all good things, a holy and most solemn restoration of nature herself. There is perhaps something of this magical religious and moral philosophy in the profundities about “nature” in *The Winter’s Tale*. (Yates MMS 91)

Yates looks for and finds some general overlapping areas between Bruno and Shakespeare, especially in Shakespeare’s use of magic in his later plays. But can we now, finally find a clearer path forward so that the “entirely new approach to the problem of Bruno and Shakespeare” that Yates called for 47 years ago would finally have a chance to be made?

To get to this path, we will have to go back to Shakespeare’s earlier plays. It makes sense that if Yates is correct when she writes that “the problem of Bruno and Shakespeare goes very deep” that the Bruno-Shakespeare connection must have gotten its start much earlier in Shakespeare’s career, long before he wrote *The Winter’s Tale* and *The Tempest*. We will also have to look beyond magic and look at other ideas of Bruno’s for influence in Shakespeare’s work. Examining other aspects of Bruno’s philosophy, besides magic, we find heliocentrism as a key point:

A recently discovered text tells us that Giordano Bruno, when advocating Copernicanism at Oxford, did this in a context of quotations from Ficino’s *De vita coelitus comparanda*. This famous philosopher of the Renaissance thus saw the Copernican sun in some close relationship to Ficinian sun magic. The analyses which I shall make in later chapters will show that Bruno was an intense religious Hermeticist, a believer in the magical religion of the Egyptians as described in the *Asclepius*, the

imminent return of which he prophesied in England, taking the Copernican sun as a portent in the sky of this imminent return. He patronises Copernicus for having understood his theory only as a mathematician, whereas he (Bruno) has seen its more profound religious and magical meanings (Yates GBHT 173-4)

The unique way that heliocentrism was interpreted and captured by Bruno alone among Renaissance Hermeticists makes Bruno stand out: “There was no actual Hermetic explanation of Copernicanism, and Bruno was the only thinker who connected the Copernican image of the cosmos with Hermeticism and the concepts of Ficino (Ebeling 102). That is, Bruno thought along heliocentric lines, but Yates frames his differences with Copernicus thus: “Copernicus has made a beginning, but, being only a mathematician, he has not understood the profound meaning of his discovery.” (Yates GBHT 259). In other words, Bruno took Copernicus’ ideas further: “Thus the wonderful bound of the imagination by which Bruno extended his Copernicanism to an infinite universe people by innumerable worlds, all moving and animated with the divine life, was seen by him---through his misunderstandings of Copernicus and Lucretius----as a vast extension of Hermetic gnosis, of the magician’s insight into the divine life of nature” (Yates GBHT 273) At his trial, which lasted from 1592 until his execution for heresy in 1600:

Bruno gave a very full and frank account of his philosophy, rather as though he were addressing the doctors of Oxford, Paris, or Wittenberg. The universe is infinite, for the divine power would not produce a finite world. The earth is a star, as Pythagoras said, like the moon and other planets and worlds which are infinite in number. In this universe is a universal providence in virtue of which everything in it lives and moves, and this universal nature is a shadow or vestige of the divinity, of God, who in his essence is ineffable and inexplicable. The attributes of the divinity he understands---together with theologians and the greatest philosophers---to be all one. (Yates GBHT 384)

This peculiar and unique aspect of Bruno---he alone among his contemporaries connected Copernicanism with Hermetic ideas----makes his magical heliocentrism a good candidate ‘idea’ to check for among Shakespeare’s plays. Fortunately, there is one early play of Shakespeare’s that opens a door, a tiny secret and spell-binding four-word door ----“**Juliet is the sun**”----into the magical, mystical and uniquely conceived heliocentrism of Giordano Bruno. To open this door, indeed, we will have to make a profound leap in changing our understanding of these four words. For centuries these four words have been understood (to use Yates’ phrase in the first passage above) as “*pedantic or empty use of language*”, mere metaphor and nothing more. Now I suggest that we

will have to see them (using Yates' paraphrasing of Bruno in the same passage above) differently: as "*significant language---language which captures the voices of the gods*". The play where these lines are found has abundant sun imagery and moreover its never-ending popularity (it has many movie interpretations and is constantly being produced on stages and assigned in classrooms all over the world) means that it should attract our attention: that is: we should wonder if the intense cluster of on-going artistic, commercial and educational activity surrounding this play indicates the presence of something a bit unusual.

Park Honan calls the balcony scene in Act II, scene ii of this play, "the most famous scene is any drama" (Honan 210), while the first two lines of that scene contain the most famous metaphor in the English language (and what I posit is the secret four-word door into the magic heliocentrism of Giordano Bruno): "**Juliet is the sun**". The fame of this line and the enduring fascination both it and the play it is found in it casts upon popular culture may be a subtle indication of a subtle depth, unplumbed secrets, and invisible links to ideas that catch and secure philosophical meaning, very like an undertow current that cannot be seen yet is there in the ocean. These secrets, once revealed, may shine a passionate light on the true connections between Bruno and Shakespeare. I intend to use this paper to reveal these links: there are many. They are secret and they were intentionally hidden by the ingenious playwright William Shakespeare.

We know that *Romeo and Juliet* was written during the time that Giordano Bruno was in prison (first in Venice and then in Rome). Earlier, however, Bruno had spent time in England, and had lectured there, also publishing his Italian dialogues in the 1580s. To sum up Bruno's diverse (but connected) interests: religion, philosophy, science, the art of memory, magic, and more, is a bit beyond the scope of this paper. Yet his influence on Shakespeare, who was in his formative years when Bruno was in England, may be much more profound than has been recognized. I hope that this paper will address this issue.

Older drama forms inside the larger plays

Critics have pointed to the influences of older theatrical forms on Shakespeare's *A Midsummer Night's Dream*, which contains a play performed by amateurs, like the mystery plays of Shakespeare's youth. (Greenblatt 35-6) The May Day festival, when lovers would celebrate in the forest, is also recalled in this play's plot and themes. However, another play by Shakespeare which was written at the same time as this play (1595-96), and noted for thematic similarities, *Romeo and Juliet*, has not been investigated for similar influences from older theatrical forms, rituals or festivals, nor for a possible hidden dramatic play (rituals, festivals and earlier dramatic forms share common roots) although Juliet's birthday is "Lammas-eve" (I.iii.17). (Lammas was a harvest festival, held August 1, with somewhat obscure roots which may be pre-Christian.) In other words, *Romeo*

and *Juliet* begs to be investigated along similar lines to *A Midsummer Dream*: we must look for connections to older forms and conventions.

Because old harvest festivals were connected to the seasons and rhythms of nature, an investigation into the symbolic significance of Juliet's birthday should naturally begin with the number of references in this play to the sun (a focus of seasonal change and bringer of harvests). Examining the first incidence of the word "sun" in the play is fruitful because here the image contains a seemingly incidental reference to pagan sun festivals in a line, spoken by Benvolio, that seems on the surface to highlight an aristocratic and decorative speaking style, "Madam, an hour before the *worshipp'd sun*/Peered forth the golden window of the east" (I.i.139-140) (my emphasis). *Romeo and Juliet* contains 14 direct uses of the word "sun" and more allusions if you count indirect references such as "Titan" (II.iii.4), "Phaethon" (II.ii.3), and "Phoebus" (II.ii.2). Juliet seems to be a locus for these images (indirectly or directly): that is, the sun images seem often to *cluster around Juliet* in one way or another. Besides the famous "Juliet is the sun" (II.ii.3) line, Juliet herself seems to be driving the horses of Phoebus Apollo when she says "Gallop apace, you fiery-footed steeds/Towards Phoebus' lodging; such a waggoner /As Phaeton would whip you to the west" (III.ii.1-3). The Nurse's reminiscences about Juliet's childhood contain these lines: "Sitting in the sun under the dove-house wall" (I.iii.27), while Juliet herself utters four more instances of the word "sun". Before meeting Juliet, and in the misery of his unproductive love aimed at Rosaline, Romeo is said to be "like a bud bit with an envious worm...ere he can dedicate himself to the sun" (I.i.150-153). Examining sun imagery can bring us part of the way to an understanding of the play: we can see activity, a cluster of activity of language oriented around the sun and Juliet. But how to proceed from there?

In his innovative and perceptive study from 1967, *Shakespeare and the Popular Tradition in the Theater*, Robert Weimann makes many general connections between Shakespeare's plays and earlier dramaturgical forms such as seasonal rituals, morality plays, and mystery plays. According to Weimann, "Shakespeare used and developed popular traditions within his larger artistic synthesis" (Weimann 192). In other words, in a search for an older dramatic form hidden within this play, we may need to examine *Romeo and Juliet* from a theatrical (and dramaturgical) perspective, not merely a literary or poetic one: that is to say, poetic images of the sun are a start but not enough. We should explore this play more properly as a "profound interaction of poetic imagination and theatrical technique" (Weimann 223).

In the case of *A Midsummer Night's Dream*, the reference to the mystery cycles is clear, as the play within the play is overt. *A Midsummer Night's Dream* itself may point the way for a clue to a hidden play in *Romeo and Juliet* since the real mystery plays were nearly all concerned with Biblical themes (Weimann 90), while the play-within-the-play in *A Midsummer Night's Dream*, the story of "*The most lamentable comedy and most cruel death of Pyramus and Thisby*" (I.ii.11-12) is from pre-Christian Greek mythology. That is, something seems slightly skewed or strange, and we should not

expect, perhaps an up-front presentation of an older technique, but rather a creatively re-imagined one. The story of Pyramus and Thisby also obviously parallels the tragic young love of Romeo and Juliet and therefore might be another indication of a hidden play.

Yet another clue is found in *Love's Labors Lost*, written at about the same time as both *Romeo and Juliet* and *A Midsummer Night's Dream*. The lead, a character named Berowne says: "All hid, all hid, an old infant play,/Like a demie God,/Here I sit in the sky,/And wretched fooles secrets heedfully ore-eye. (IV,iii.78-80). Robert Weimann takes these lines as an allusion to the old mystery plays (in mystery plays one actor played Deus and sat in the 'heavens' of the stage looking down on the actors) (Weimann 229). Weimann asserts that these lines show Shakespeare's interest in the "potentialities of stagecraft that hinges on deliberately varied degrees of dissociation from illusionistic action" (Weimann 229). But what if the lines refer instead (or also) to another "old infant play" (with infant meaning "in its earliest stage, newly existing, ungrown, undeveloped, nascent" (OED))¹ "all hid" in *Romeo and Juliet*? At the very least they show that Shakespeare, whose dramas are full of people in disguise and plays-within-plays, might have been interested in undertaking such a project.

Further evidence for this line of reasoning is found in the fact that the character Berowne is Giordano Bruno's "namesake" (Yates GBHT 391) and "an echo of Bruno's visit to England" (Yates GBHT 391). Yates argues that "a long line of writers (including herself)" (Yates GBHT 391) has tried to find the connection between Bruno and Berowne but "none of us has known what to look for in the play" (Yates GBHT 391). The complex mechanism is there, but subtly hidden: it is Berowne-Bruno's finger pointing over to the next play, *Romeo and Juliet*, where the cosmic ideas of Bruno's are adapted somewhat and framed in allegorical form.

"Virtue" and "Vice": terms from the old morality plays

Another strong hint about a possible hidden play in *Romeo and Juliet* comes from Friar Lawrence, the friar in the play, who says, "Virtue itself turns vice, being misapplied/And vice sometime by action dignified". (II.iii.21-22). The words "virtue" and "vice" point again to a hidden morality play. Morality plays were medieval allegorical dramas, with themes drawn from Christian liturgy, where a character named Everyman (or Mankynde, and other such general terms that represented humankind) makes a choice between Vice and Virtue. On the surface, these plays were meant to reinforce and teach religious piety but Weimann makes the point that the Vice character (also named Riot, Greed, Myscheff, Avarice, etc.) was "usually performed by the leading actor or director

1 Weimann gives these definitions from the OED but he doesn't state that these lines could point to a hidden play in another of Shakespeare's works.

of the group” (Weimann 43) implying that he was the most talented or skillful. Therefore, despite his low liturgical stature, the Vice’s theatrical ranking was high. The Vice’s role had evolved from more participatory rituals and festivals, where the “Lord of Misrule” or mock king or clownish priest “is chosen to preside over the reveling community, playfully turning the conventional order of things upside down”. (Weimann 21) The interplay between Biblical text, the audience, the old rituals and festivals, and the actors’ own feeling for the traditions it was working within and yet simultaneously changing produced powerful dramatic irony and tensions.

From boyhood observations of this evolution, Shakespeare must have realized he could also use written (poetic and literary) and also unwritten (extra-literary, nonrepresentational, gestic and purely theatrical) techniques emerging from the mixing of past theatrical traditions and the drama as it was evolving in London to make something completely new. According to Weimann, Shakespeare’s “achievement consists of having combined the new poetic realism with modified and experimental versions of traditional stage practices”. (Weimann 237)

We will need to examine *Romeo and Juliet*, then, for the presence of secret identities which interact in a way that recalls or summons up the basic interactions of the main characters in the old morality plays. We need an Everyman caught between two opposing forces, a Virtue and a Vice. The bold and stunning “Juliet is the sun” pronouncement begs to be addressed first: could this significant line, one that has mesmerized Western culture for centuries, *possibly be indicating the presence of a secret identity---and one that is **hiding in plain sight?*** Juliet also seems to *personally* (in what seems to be a mischievous hint by the playwright) *actually drive* Apollo’s horses in the “Gallop, you fiery steeds” speech. If, then, we make the leap to claim that she *is* the sun (and the Virtue: surely such an attractive character cannot be the Vice!), in the hidden play, then it is logical that Romeo, another central character, is therefore the “Everyman” character who does, after all, choose her. We will need, of course, to decide just on what terms she is conceived of as the sun; the role she plays as the sun is made more explicit below.

Romeo’s role as Everyman is hinted at in the same important introductory speech by Friar Lawrence where the words “Vice” and “Virtue” are used. The key point to emphasize is that *stage directions and theatrical methods are part of the transmission of Romeo’s hidden role as Mankind*. In the following passage, Friar Lawrence’s important “vice” and “virtue” speech, note how Romeo enters just in time to be compared to “this small flower”:

O mickle is the powerful grace that lies
In plants, herbs, stones, and their true qualities;
For nought so vile that on the earth doth live
But to the earth some special good doth give:
Nor aught so good but, strain’d from that fair use,

Revolts from true birth, stumbling on abuse,
Virtue itself turns vice, being misapplied,
And vice sometime by action dignified.
(*enter Romeo*)
Within the infant rind of this small flower
Poison hath residence and medicine power:
For this, being smelt, with that part cheers each part;
Being tasted, slays all senses with the heart.
Two such opposed kings encamp them still
In man as well as herbs, grace and rude will;
And where the worser is predominant,
Full soon the canker death eats up that plant. (II.3.15-30))

Far from this tragedy being one of “mere chance” (Evans 1055) as many critics have asserted, the tragedy comes from the “two opposed kings” (virtue and vice) which “encamp” “in man as well as herbs”, and then having the “worse” one win (Man makes the wrong choice). The comparison of Romeo to the flower can only be understood dramatically (since Romeo enters just when the Friar picks up the flower). The Friar doesn’t know that Romeo is there and so only the audience can make the connection between the flower and man. This tragedy can only be understood correctly if the audience fits the “virtue” and “vice” references together with the subsequent “two such opposed kings” image and realizes that a morality play is in progress.

The Vice figure is a little more difficult to see at first because the Vice character is split into two in *Romeo and Juliet*. That is, two different characters share the role of the Vice. As I have noted, the Vice generally was an attractive, tempting, comic, and central character often played by the leading actor of the troupe. Mercutio is the one with the requisite wit and bawdy humor, and when Romeo “chooses” Mercutio (revenging Mercutio’s death by fighting Tybalt) Romeo does indirectly forfeit Juliet. Mercutio’s “Queen Mab” speech (see the section below) also puts forth the imperative behind the emergence of complex economic phenomena, related to the flows of matter and energy from the cosmos (this flow of matter and energy connects us to the cosmos, we depend on these flows passing through our bodies to sustain our material beings); The Queen Mab speech explains the root of the compelling force behind an economy: to eat, to gain advantage, to consume. Mercutio is therefore one half of the Vice character.

The old Vice character would have normally led Everyman into committing some sort of sin, a depiction of Christian petical notions. But Mercutio is instead a kind of new scientific version of the older Vice . What he leads Romeo (Everyman) to do (in allegory) is one of the actions that defines us as a species: we, unlike other animals, can switch our energy sources through using fire.

(Fire gives us advantages to help us tap into material flows, through making tools, cooking food for more efficient eating, etc.) We use fire for our advantage and for that we need fuel. In Shakespeare's day, coal was the fuel rapidly replacing wood. Forests could no longer provide enough wood for a rapidly growing population.

Therefore, the other half of the experimental Vice figure is an important character in the play but never appears and is never heard: Rosaline Capulet. (In fact, she is implicitly rejected by Romeo when he chooses Juliet, completing the morality "triangle"). There is a reason Shakespeare exiles Rosaline from the text. Her name (her character had no name in the source for this play; Shakespeare bestowed it upon her himself) is an anagram for "sea coal", while the first line of the play, "Gregory, on my word, we'll not carry coals" (I.i.i) points to the importance of this issue, coal, which faced the Elizabethans. Forests were no longer plentiful enough to fuel the growing population yet coal was polluting and depleting. And it is in relation to coal that we can understand on what terms we should take Juliet's secret role as the sun: the sun here is a source of root sustenance or basic *wherewithal* to get other things, what we would today call "energy".

"Gregory, on my word, we'll not carry coals"

We know that Shakespeare often used the first lines of his plays to announce or reveal---opaquely, sketchily and in metaphor---his major theme or purpose in that play. Frank Kermode writes, "Shakespeare normally opens with plot and thematic material of the highest importance, shrewdly and economically presented". (Evans 1138) The first line of *Romeo and Juliet*, "Gregory, on my word, we'll not carry coals". (I.i.1) is therefore another clue, like Friar Lawrence's use of the words "vice" and "virtue" together, and it could provide a basis for an opposition (Rosaline=fossil fuel=Vice) to the sun (Juliet=Sun=Virtue) if it were somehow sustained later (We should note that the second line of the play contains the word "colliers" which seems to underscore the word "coals"). The interesting phrase "on my word" may also subtly indicate the importance of this issue for Shakespeare, an artist who placed importance on *words*. Fortunately, the coal image *is* sustained, although indirectly: the words "smoke", "fume", "choking" appear soon in scene i, all in connection with Rosaline. Romeo uses the phrases, "bright smoke," (I.i.180) "choking gall" (I.i.194) and "love is a smoke made with the fume of sighs" (I.i.190) all within 17 lines in Act I, scene i, and all within the context of his disappointed love for Rosaline. Other characters also reinforce the idea by describing Romeo (only in this scene) in similar dark imagery: a few lines earlier, Montague says that Romeo, in his misery, "makes himself an artificial night" (I.i.140), perhaps an image that recalls the coal-blackened London sky. Images of darkness are so numerous that they almost overwhelm the whole first scene: Romeo "steals himself...away from light"(I.i.137), "locks fair daylight out"(I.i.139), his humor is "black and portendous" (I.i.141) and "he is like a bud, bit with an envious worm" who

cannot “dedicate himself to the sun” (I.i.153). Rosaline, who never appears in this play although she is such a central obsession at first, is therefore the co-Vice. She shares the role with Mercutio.

The double Vice strategy is ingenious because Romeo can choose Juliet and reject Rosaline (thereby affirming the intrinsic superiority of the sun). But later Romeo “chooses” Mercutio (by killing Tybalt in revenge for Mercutio’s death), mirroring the rapid rise in coal consumption ---which meant the gradual loss of and transition away from the sun-based economy---occurring quite intensely in the Elizabethan era (figured as Romeo’s exile from Juliet). Shakespeare hid what we today would call a *very radical environmentalist agenda*---he saw this transition as destructive and temporary (though long-lasting), though also inevitable. Shakespeare seems to have deplored coal and its effects on his country: the desperate economic competition and growth is spurred are figured as a desperate man fighting his enemy to the death and winning.

Coal and the Elizabethans

If we can imagine how the sun functioned in the town of Shakespeare’s boyhood in the country, we can understand how the later values in London of coal/urban/literate/written/abstract/new/poetic/complex competed successfully against the traditional values sun/rural/illiterate/unwritten/concrete/old/theatrical/simple. The sun sustained the rural communities that used agriculture as its economic base. The sun was the focus for seasonal festivals. The sun was constant (it did not deplete), but it was limited by the land area available struck by its rays. This limitation of the sun made coal gradually more and more attractive---and then progressively more and more indispensable. This process of intensifying structural dependence on coal, especially in London, occurred in the 1570s as population growth outstripped the ability of forests to provide fuel. Peter Brimblecombe explains:

By the end of the Elizabethan era (ca 1600) coal had stopped being a solely industrial fuel, as the shortage of wood forced it into use in the home...The quality of London’s air deteriorated rapidly... (Brimblecombe, 1158)

Barbara Freese explains what would have happened if British coal resources had not been present:

If the (wood) fuel shortage of the 1500s had continued to deepen, it would eventually have slowed not just the economic growth, but also the population growth of London... It is hard to imagine (the flow of eager immigrants from the countryside into London) continuing despite a fuel shortage that would have choked the economy and made urban life even more difficult than it usually was. Eventually, life in London would

have become unbearable, and people would have chosen to stay in the countryside, closer to the forests, where at least they could have afforded to heat their homes and bake their bread. Later, as the forests continued to shrink, the fuel shortage might have slowed the population growth of the entire nation. Demographic studies show that in preindustrial England, tough economic times caused people to marry later, lowering birthrates.

But the energy crisis never got that severe for one reason: coal. Domestic coal use surged in the 1570s, and before the end of Elizabeth's reign, in 1603, coal had become the main source of fuel for the nation, though not without complaint. (Freese 32-3)

The northern areas of England indeed had vast coal reserves. Economic growth and resulting population growth could be sustained due to these coal reserves, which in turn necessitated further use of coal. As coal came to be used more and more, complexity in the culture was generated in an emergent and gradual process of problem solving that Joseph Tainter describes in his 1989 book, *The Collapse of Complex Societies*.²

Shakespeare clearly benefited professionally and financially from the new, more modern, wealthy and complex economy that flourished in London. But perhaps, he had his doubts about the growing structural economic dependence on coal. In this, he was not alone. The rich in London tried to avoid using coal, which was "despised for its smoke" (Freese 33), but by 1620, "the nice dames and nice gents had succumbed...coal was (by then on) widely used in the homes of the rich as well as the poor. (Freese 33) "Many writers of the period wrote with considerable vehemence against the burning of coal" (Brimblecombe 1158), including John Evelyn who wrote the celebrated anti-coal book *Fumifugium* (1661). In 1578, "it was reported that Elizabeth I was 'greatly grieved and annoyed with the taste and smoke of sea-colles'" (Brimblecombe, quoted in Freese 34). Hugh Platt in a tract written in 1603 noted that coal smoke "was damaging the buildings and plants of London" (Platt, quoted in Freese 34).

Social historians describe what occurred economically in Britain, especially in London, in the second half of the 1500s as "an early industrial revolution". (Nef quoted in Weimann 164). "Coal mining...developed so rapidly that deliveries to London increased more than threefold between 1580 and 1591 (1580: 11,000 tons; 1591-2: 35,000 tons)". (Weimann 164) "Shipments of coal

2 Tainter explains "Four concepts can lead to an understanding of why complex societies collapse:"

1. human societies are problem-solving organizations.
2. sociopolitical systems require energy for their maintenance.
3. increased complexity carries with it increased costs per capita.
4. investment in sociopolitical complexity as a problem-solving response often reaches a point of declining marginal returns. (Tainter 93)

from Newcastle grew from 33,000 tons in 1563-64 to 163,000 tons in 1597-98" (Weimann 164). A "construction boom" (Weimann 164) took place in London, and a contemporary observer, John Stow noted its effects:

In his great and stately *Survey of London*, published in 1598, when he was in his seventies, John Stow noted with dismay how many districts that formerly looked out on open fields where people could 'refresh their dull spirits in the sweet and wholesome air' now gave way to vast encampments of smoky hovels and workshops. (Bryson, 46)

Shakespeare was born in 1564 and his childhood in Stratford-on-Avon, a country town, was fueled by wood (coal was burned in London, a port city, reachable by sea from the north, and in northern parts of England where it was mined). However, his adult life in London, where he moved in the late 1580s was fueled (ever increasingly) by coal. He would have noticed the difference in landscape, air quality, and population density.

"Juliet is the sun" is finally an expression to show the risks and consequences----and the process of *becoming aware* of these risks and consequences---of structural dependence on a fuel that both pollutes and depletes---and it was well-known in Shakespeare's era that coal was depleting (Freese 28). Moreover, Shakespeare seems to have applied some of Giordano Bruno's ideas about heliocentrism and cosmic unity directly to what Yates calls the "miseries of the times" (Yates GBHT 392), to show what Hamlet calls (in his description of the purpose of dramatic performance) "the very age and body of the time his form and pressure"(III.ii.23-4).

I will show, moreover, that the parameters which set off the hidden morality play---which reveal Shakespeare's vision of the sun-man past history, the Elizabethan contemporary man-sun relationship, and the future of man and the sun-----within *Romeo and Juliet* are not only poetic but also theatrical (gestic, etc..) and share a historical lineage with earlier, simpler, and more folkish dramatic forms. This lineage, a rural one, secretly sits at the center of the play, buried under the brilliant poetry and urbane wit of the feuding aristocrats.

The nonrenewable---that is, depleting---quality of coal led to Shakespeare's decision to see it as disruptive to a system (in which human beings are included) that was essentially as cosmic unity, a unity which Bruno had also posited (though Bruno doesn't seem to have discussed coal specifically). The tendency of fossil fuels to deplete----to be even more remote and inaccessible (as easy deposits are drained first), even as a society comes to need them more and more---was personified by Shakespeare as an eternally cold woman, Rosaline Capulet, whose heart could never be won.

Theatrical elements of older dramaturgical forms in *Romeo and Juliet*

Before Juliet appears for the first time, the nurse calls her onto the scene with these lines: "Now by my maidenhead at twelve year old, I bade her come. What lamb! What ladybird! God forbid! Where's this girl? What, Juliet!" (I.III.2-4). The footnotes in the *Riverside Shakespeare* try hard, but do not adequately explain the lines "God forbid" : "God forbid there should be anything amiss (?) or God forbid I should call her "ladybird" (cant term for prostitute)"(Evans 1063). Weimann notes that "The way in which each actor is successively called onto the stage or introduces himself" in the mystery cycles and morality plays suggests a link between these forms and older folk plays (Weimann 61). Indeed, we can note that Juliet is *called onto the stage*. This simple fact establishes a link to older rituals. In addition, the words the nurse uses, although they may seem foolish and naïve, more nonsense prattle than anything else, actually have a function to define Juliet in the context of her secret identity as the sun (in the hidden morality play): she is *close to being a god of some sort*, if she is not actually one, and she (i.e. the solar way of life) begets, in this panoplied vision at least, a joyous, benign nature, symbolized by "lambs" and "ladybirds".

The character of the Nurse belongs to the tradition of the fool or clown. The fool or clown was, according to Weimann an archaic element, "closest to his early ritual heritage..... an atavistic agent of a cult...and its heretic"(Weimann 11):

(The clown or fool's) inexhaustible vitality and unbroken continuity have a good deal to do with the ambivalence of his dramatic functions: he retains the capacity both to enchant and disenchant. He can neutralize myth and ritual through the unmasking and debunking potential of mimesis, through his parody, criticism, or cynicism; but he can also generate a ritual dimension through the fantasy and madness of his topsy-turveydom, or through his inversion of values and the transformation of reality into something strange, sad, or comical.(Weimann 11)

Through this topsy-turveydom, the fool or clown figure could have a powerful ability to tell the truth (hence the Nurse calls "God forbid" when she calls Juliet, letting slip the truth that Juliet may be a divine power), only it usually wouldn't be recognized as such by other characters. It is mainly the nurse who can (verbally) access the sacred solar aspect of Juliet, because the Nurse's dramaturgical lineage is old enough to go back to early rituals and festivals where the sun was indeed a god. Fools also traditionally "carried the ancient cudgel or clowns's club (with its obvious phallic antecedents and links to fertility rites)" (Weimann 31). True to this spirit, Juliet's Nurse is ever ready with a bawdy comment, and always in relation to Juliet: "Thou wilt fall backward when thou hast more wit" (I.iii.42), "But you shall bear the burthen soon at night" (I.v.76) and this aspect of Juliet (the

sun associated with seasonal and pagan traditions involving fertility rites which the nurse relates symbolically by explaining that Juliet's birth is on Lammas Eve) can, importantly, only be *accessed*---that is related or narrated---by the Nurse.

Fools and clowns served as "processional leaders" in the May procession, Robin Hood plays, Mummers Plays and the Sword Play (all folk festivals predating the Renaissance); here, fools "maintained particularly close contact with the audience"(Weimann 30). In addition, "their processional function entailed the opening of the play, (and) a request for room and attention" (Weimann 30). Juliet's Nurse maintains close contact with the audience through her speech which is prose. It is true that she does not open the play with a request for room and attention, but there is a stylized request along those lines spoken by the Chorus: "...The which if you with patient ears attend/ What here shall miss, our toil shall strive to mend" (14-15). This speech recalls older forms and serves as another pathway back to them; *Romeo and Juliet* seeks to trace these pathways back and establish links to an earlier way of life and culture. It seeks to teach its Elizabethan audience where they had come from and give them clues about the underlying reasons things were changing: to show the "form and pressure of the age" as Hamlet describes the role of dramatic performance.

Weimann also notes that "The most fundamental motif of the folk drama" is "the death and resurrection of the protagonist" (Weimann 61). Here, too, *Romeo and Juliet* does not fail to supply a resonant note, when Romeo says, "I dreamt my lady came and found me dead---/Strange dream, that gives a dead man leave to think!---/And breath:d such life with kisses in my lips/ That I revived and was an emperor." (V.i.6-9) Shakespeare here peers forward to the age when coal is depleted and man returns to the sun. The hidden morality play, in four parts, is essentially concerned with this process.

The hidden morality play and its message

Romeo and Juliet have five scenes together. Symmetrically, the first two and the last two, are set apart: in these scenes, they always play virtually alone, with other characters calling off-stage (or dancing nearby at the mask) but not fully interacting with the couple *as long as the couple is together*. Thus Romeo and Juliet seem to exist in a separate realm where just the two of them are permitted ontological seclusion. Their ontological isolation is delineated structurally with an absence (not a *total* absence, more like a *functional* one) of interaction with other characters. Take this together with the fact of their allegorical identities as Man and Sun, and it is logical to conclude that their scenes, always conducted in private, have another theatrical dimension: the hidden morality play. It is here---in order to "read" the morality play correctly--- that I would like to add another rather archaic dramatic form onto the already rather crowded stage: the *tableau vivant*, a studied, formal, didactic and rather distant drama form used in royal and liturgical processions to illustrate (with living but silent actors) famous battles or Biblical scenes. (*Tableaux vivants* usually

displayed silent and motionless actors but Shakespeare added sound and action, another experimental modification.)

The first *tableau vivant* (demonstrating the first stage of Mankind's relationship with the Sun) is characterized, naturally, as one of worshipper and god. Thus when Romeo and Juliet meet (the first scene where they play together), they exchange puns along religious lines: she is a "holy shrine" (I.v.94); his lips are "two blushing pilgrims" (I.v.95). Celtic Pantheism was widespread around the British Isles in vestigial form until the 1400-1500s. It had nature goddesses and a sun god. Also, Shakespeare was familiar with Classical deities, including Apollo. It is important to note that Romeo doesn't know Juliet's name in this part of the anthropological pageant Shakespeare attempts to portray: Mankind is still operating without many skills or scientific knowledge. Theatrically, that is to say structurally within the play, this scene is one of introduction and one of reverence. The overall impression we can get from it is therefore the important part in characterizing its role within the hidden morality play.

The second stage of the relationship between Mankind and the Sun is shown in the long and famous "balcony" scene (the second scene where Romeo and Juliet play together). Juliet is aloft, *symbolizing her position as the sun in the sky above Man*. (Her place on the balcony is another theatrical device, not a literary one). He knows who she is and understands her importance, but she is no longer a god. He swears fidelity. She explains that she'll "prove more true than those that have more coying to be strange" (II.ii.101) (That is, the sun will not become depleted.) The sun has stopped being a deity (with the advent of Christianity) but Man has not yet started using fossil fuels--ie, being unfaithful to the sun. This scene corresponds to the Middle Ages, a time of faith kept in agricultural ways of life. Romeo asks for her "faithful vow" (II.ii.127) in exchange for his. But an uneasy feeling "I am afraid...this is all but a dream" (II.ii.139-140) pervades. Can Mankind really be satisfied to stop his progress? He wants to unite with Juliet, or pledge fidelity to the Sun forever, but a strange metaphor undercuts the idea: Juliet says she "would have him gone---/And yet no farther than a wanton's bird/That lets it hop a little from his hand/Like a poor prisoner in his twisted gives/And with a silken thread plucks it back again" (II.ii.176-180). She adds, "I should kill thee with much cherishing" (II.ii.184). It almost seems that wild freedom---even bringing calamity---might be preferable to imposed limits.

The third stage of the pageant is the morning after the (secret) wedding night in Act III, scene v. (The fourth scene where Romeo and Juliet play together). Romeo has "chosen" Mercutio (one of the Vice characters) by killing Tybalt in revenge. This action symbolizes Man's action in choosing fossil fuels: an expedient to forestall a competitor from gaining advantage first. She recognizes his deceit, "O serpent heart" (III.ii.73). These events set up the sense of hurrying in the third tableau. It is the start of fossil fuel consumption (becoming exiled from the sun, as the Elizabethans were rapidly becoming), but the wedding morning *tableau vivant* proves that the transition is to include a long and

self-aware good-bye to the natural life of living sustainably in seasonal rhythms. What could stop the industrializing process, once it began, except the disastrous depletion of the coal resources the whole process depended on? Romeo says, "I must be gone and live, or stay and die" (III.v.11), indicating Man's predicament as he faced a stark choice to continue to use more coal---depleting it yet more---or suffer hardship. "O, think'st thou we shall ever meet again?" (III.v.51) asks Juliet after she says "...I shall be much in years Ere I again behold my Romeo!" (III.v.46-47). The separation of the man and the sun (as primary energy source) is to be protracted, but the outcome of this separation is certain: when the coal is depleted, man will go back to the sun.

Finally, the intricate pageant ends with the last *tableau vivant*---in the indeterminate future with Romeo's death---this death is a kind of social and economic collapse, in the sense of the term as Joseph Tainter defines it. In Tainter's seminal 1989 work, *The Collapse of Complex Societies*, Tainter explains how societies develop complexity, specialization and higher levels of sociopolitical organization as they solve problems using energy (Tainter 91-93). Complexity may bring about cities where many people no longer engage in agriculture or basic food production. A large elite class and specialized hierarchical occupations are also generated. But as the energy supporting the sociopolitical organization that controls the whole system becomes less available (either through geological depletion or through the technical inability to rule and maintain larger and larger areas of land), eventually people can no longer benefit from further investments in complexity; economizing by returning to lower levels of complexity follows. (Tainter 93) However, the complex and emergent nature of the system makes this process of decline a chaotic fall or breakdown. In the fourth *tableau vivant*, Romeo (Mankind) dies by suicide, symbolic of an economic collapse, in some fashion at least (though through emergence) caused by his own hands. (It is important to note that a real collapse process could take centuries: Romeo's suicide is an artistic and figurative illustration only.)

What about the only scene where Romeo and Juliet interact together fully and functionally with *one other character*? *Friar Lawrence shares one brief scene with the couple* (their third scene together) (II.vi.16-37). (This brief scene occurs directly before their secret wedding). *He is the only character briefly permitted into their ontological "magic circle"* (i.e. he can interact with them when they are together as no other character can) because, as a stand-in for Shakespeare, he is in on the secret. He is therefore called "ghostly" ("ghostly father", "ghostly confessor") four times in the play, (three times by Romeo and once by Juliet) to underscore his ability to cross through partitions such as the one of the secret play; *Romeo and Juliet share a special bond with him and him alone*. (See the section below "Biophysical Economics and Virtue and Vice" for an extended discussion of Friar Lawrence's importance to the play. Essentially, he voices Shakespeare's ideas on coal use in a more simple and allegorical form).

Another major clue³

Lady Capulet says to Juliet:

Read o'er the volume of young Paris' face,
 And find delight writ there with beauty's pen.
 Examine every married lineament
 And see how one another lends content,
 And what *obscured in this fair volume* lies
 Find written in the margent of his eyes.
 This precious book of love, this unbound lover,
 To beautify him only lacks a cover.
 The fish live in the sea, and 'tis much pride
For fair without the fair within to hide,
 That book in many's eyes doth share the glory
That in gold clasps locks in the golden story.
So shall you share all that he doth possess
 For having him, making yourself no less. (I.iii.87-100)(my emphasis)

The italicized lines hint openly at the secret play contained in the larger play. And they also point philosophically to the importance of the hidden cosmic play for Shakespeare ("all that he doth possess")⁴.

In addition, the color "gold" ("gold clasps" and "golden story") here is extremely important because "gold is the prime metal of the Sun" (Cohen 353). "The color gold had long been established in the classical canons of beauty and power. Almost two thousand years before Homer, in the time of the Proto-Indo-Europeans, the color was connected to the worship of Sun and fire, and to the adoration of a yellow dawn goddess" (Cohen 353). In effect, Shakespeare gives us another esoteric clue, demonstrating his learning and sensitivity to history and myth. He may also be hinting, and not for the first time, that Juliet is (at least in part) a sun goddess.

3 I did not notice this clue until I read Ron Rosenbaum's book (Rosenbaum, Ron. *The Shakespeare Wars. Clashing Scholars, Public Fiascoes, Palace Coups*. New York, NY: Random House. 2006.) pages 378-9 after I had found the secret play. He says these lines hint at a secret play in *Romeo and Juliet*, but he cannot say what this play is and he does not perceive the secret allegory that I have found.

4 Rosenbaum also points out how important these emphasized lines seem to be, although he cannot explain why.

Emergence

Emergence is “the arising of novel and coherent structures, patterns and properties during the process of self-organization in complex systems”. (Corning 7) “Indeed, the interactions among the parts may be far more important to the understanding of how a system works than the nature of the parts alone”. (Corning 15) Aristotle identified something like the concept of emergence in his *Metaphysics*: “In the case of all things which have several parts and in which the totality is not, as it were, a mere heap, but the whole is something besides the parts, there is a cause; for even in bodies contact is the cause of unity....” (Book 8.6). It is possible that Shakespeare read this passage from Aristotle and applied the ideas in forming his own conclusions about the two economies he knew from experience: one in Stratford-on-Avon and one in London. Both economies were emergent, the parts forming a “unity” (this concept of unity also touches on Bruno’s idea that the cosmos is “all one”). And, in comparing the two economies, the major difference that he could see would have been the coal in London.

Each individual is acting rationally, yet by acting collectively in large numbers, humans can produce profound and unintended changes in their environment. *Romeo and Juliet* represents Shakespeare theorizing about a complex human society arising where the powerful and concentrated energy flows from coal would permit manipulation of material (through commerce) to create and destroy on a vaster scale than when small amounts of wood were the only fuel and limited and dispersed (i.e. solar) energy flows also limited the scope of competition, the size of the elite classes, the size of the population and the amount of materials in circulation. The Everyman-Romeo character then was perhaps Shakespeare’s own new conception (borrowed from older and simpler pious allegorical models) to treat an idea of collective behavior. *Romeo and Juliet* gives a voice to Shakespeare’s fears about the emergent and structural inability of humans to avoid “the tragedy of the commons”, expressed in the play at the end as “all are punish’d” (V.iii.295).

“Juliet is the sun” and the “language of the gods”

Shakespeare also uses emergence in the way he handles imagery. Rosaline is associated with darkness and smoke, yet we cannot really affirm that she is “coal”, a fuel source that differs from the sun, until we do see a character who *is* associated with the sun. We must also put the other images (and other clues, such as the first line of the play, Friar Lawrence’s Act II speech (more on this later), and the fact of the masked ball, which playfully indicates that some characters may be in disguise) together in an interpretive “interaction” to make the decision to say this play is about coal and the sun.

One truly amazing aspect of *Romeo and Juliet* is the way that Rosaline, such a source of angst

and focus of conversation early on, is neither seen nor heard, although Romeo goes to the party **in order** to see her. He sees Juliet there and is overwhelmed by love. I would like to suggest that this moment (...“Did my heart love till now? Forswear it, sight!” (I.v.52)), plus the fact of Rosaline’s total absence, is Shakespeare’s successful attempt to give an overwhelming and radiant, shining privilege---through sheer presence--- to the sun over coal. The person associated with smoke and fumes is exiled---rejected, in effect---, while Juliet becomes a memorable, powerful heroine, whose lines radiate with power, so that one biographer, sensing something unusual, writes:

“(Shakespeare) takes risks in Juliet’s ‘high style’. She speaks in rather magnificent literary images with the cadences of a Roman goddess rallying the legions” (Honan 211-2). The line “Juliet is the sun” (Act II scene ii, line 2) therefore means just what it says (besides also fulfilling---and hiding behind---the literary conventions about a radiantly beautiful mistress). *Juliet is actually, really the sun*: the line pays homage to this source of energy and life for all creatures on earth, and places the sun in a superior position to coal.

Park Honan’s observation about the strange goddess-like power of Juliet’s language is not wrong. The depictions of the “sun” in this play have an emergent quality in the way that they interact, forming a moving, shifting spectrum across which we can see the rich variety of the sun’s many roles: mythical creature (Titan, Phaeton, Apollo), energy source (boundless bounty), light source (teach the torches to burn bright), way of life in the country (Lammas). Here we may also see Shakespeare creatively show a unifying process, since all the separate aspects relate to the sun. In this, he means to recall Bruno’s “God, who in his essence is ineffable and inexplicable....and whose attributes (are) all one” (Yates GBHT 391).

There are a number of images surrounding Juliet that connote the infinite natural bounty we associate with the sun: “my bounty is as boundless as the sea” (II.ii.133), “this bud of love, by summer’s ripening breath”(II.ii.121), etc. Most affecting are the images which associate gentle country life, (a way of life “dedicated to the sun”) with her: Calling to Juliet (before we see her; *this is significant because we form this natural association of her before she even appears,(just as we associate Rosaline with smoke and darkness before she is named)*) the nurse says, “What lamb! What ladybird!” (III.i.3). These, along with the nurse’s “sitting in the sun under the dove-house wall” (I.iii.27) are the idyllic images, distilled in poetry, of Shakespeare’s sun-powered slow-paced childhood in Stratford-on-Avon. When Romeo says as he watches Juliet, “Oh that I were a glove upon that hand that I might touch that cheek!” (II.ii.24) Shakespeare may be paying a private and wistful tribute to his village and his total immersion in nature there: his father was a glover.

The use of a conventional lover’s poetic language to mask a deeper philosophy also finds deep resonance in Giordano Bruno’s work. In Bruno’s *Eroicifurori*, Yates points to “Petrarcan love emblems....clearly visualized descriptions of the darts, eyes, fires, tears and so on of the common Petrarchan conceits, which are distributed throughout the work, like a chain of beads in a rosary, and

to which the poems and their commentaries are attached” (Yates GBHT 311). Yates explains that in *Eroicifurori*, these Petrarchan conceits “revert to the origin of the emblem...(and are used) as images, signs, seals, characters, voices, in living, magical contact with reality---in contrast to the empty pedant language”(Yates GBHT 311).

In a vast and general way, I believe, the way into a clearer understanding of the close relationship between Bruno and Shakespeare is through this distinction between “empty pedant language” in Shakespeare and the contrasting type of language in Shakespeare that is “in magical contact with reality”. For example, to go back to the first line of the play (“Gregory, we’ll not carry coals”), we can see that coals points to a whole world of relationships and structures that are set apart from the structures and relationships implied by a sun-based economic structure. Therefore, “in living, magical contact with reality” is a wonderful, apt way to characterize the special, *significant* way we should read “coals” and “colliers”, (especially since these are in the first and second lines of the play). Thus we cannot read “coals” and “colliers” as empty pedant language (footnotes in editions of *Romeo and Juliet* generally explain “carry coals” means “to do menial work” and see this line, therefore as a trivial index of ennui and status-consciousness on the part of the servants). Also, we cannot read “Juliet is the sun” as only empty pedant language (the lover’s conceit) either. It is a program for understanding the connections that bind us to our cosmic system. Both “Gregory, we’ll not carry coals” and “Juliet is the sun” are therefore both hidden cosmic messages “in magical contact with reality” but they are strategically camouflaged by being set among many other less significant lines. In other words, *Shakespeare was quite devious!*

Mercutio’s famous “Queen Mab” speech

Shakespeare could no doubt see the social structure from his vantage point at or near its top. People who were at the bottom in status, colliers, farmers, fishermen and others gathering raw resources in from nature supplied materials to the next layer in the social hierarchy (bakers, cooks, carpenters, blacksmiths, etc.) then these supplied the next layer up (merchants, traders, tailors, etc.) and so on, up to the professional class (preachers, lawyers, newsmen, doctors, playwrights) and finally the royalty. Likewise, in his boyhood observations of nature, Shakespeare would also have noted, for example how leaves are eaten by worms who are then are consumed by larks, who are consumed by hawks and other predators, and so on.

He could reason that there must be something important being passed on from one layer to the next---with something being withdrawn from each layer to support its members---, with each layer including fewer members than the previous layer, until just one Queen ---or one predator---remained at the top of the social or natural ecological pyramid (or “food chain”). (Ecologists know that the materials circulate and become waste eventually, while energy is used, or flows through the system,

powering it, and in the process this energy becomes heat.)

“Queen Mab” is a poetic model to transmit what Shakespeare visualized was happening ecologically, and also shows how this ecological action as it is developed in a civilization generates human economic complexity. “Mab” is Mercutio’s most famous speech, and the extravagant poetry nearly masks---while madly embracing----the exactitude and finitude of one of nature’s most severe physical laws that governs all matter, including our own bodies (This law is what compels us to eat!):

O then I see Queen Mab hath been with you.
She is the fairies midwife, and she comes
In shape no bigger than an agot-stone
On the forefinger of an alderman,
Drawn with a team of little atomi
Over men’s noses as they lie asleep
Her chariot is an empty hazel-nut,
Made by a joiner-squirel or grub,
Time out a` mind the fairies coachmakers.
Her waggon-spokes made of long spinners` legs,
The cover of the wings of grasshoppers,
Her traces of the smallest spider web,
Her collars of the moonshine`s watery beams,
Her whip of cricket`s bone, the lash of film,
Her waggoner a small gray-coated gnat,
Not half so big as a round little worm
Prick`d from the lazy finger of a maid.
And in this state she gallops night by night
Through lovers ` brains, and then they dream of love;
O`er courtiers` knees, that dream on cur`sies straight;
O`er lawyers fingers, who straight dream on fees;
O`er ladies lips, who straight on kisses dream,
Which oft the angry Mab with blisters plagues,
Because their breath with sweetmeats tainted are.
Sometimes she gallops over a courtier`s nose,
And then dreams he of smelling out a suit;
And sometimes comes with a tithe-pig`s tail
Tickling a parson`s nose a `a lies asleep,
Then he dreams of another benefice.

Sometimes she drivetho`er a soldier`s neck,
And then dreams he of cutting foreign throats,
Of breaches, ambuscades, Spanish blades,
Of healths five fadom deep; and then anon
Drums in his ear, at which he starts and wakes,
And being frightened, swears a prayer or two,
And sleeps again. This is that very Mab
That plats the manes of horses in the night,
And bakes the elf-locks in foul sluttish hairs,
Which, once untangled, much misfortune bodes.
This is the hag, when maids lie on their backs,
That presses them and learns them first to bear,
Making them women of good carriage.
This is she----(I,iv,52-93)

The “fairies` midwife” is chosen because energy is a sort of `midwife`, (or catalyst): invisibly, it allows natural processes to occur, then it vanishes as heat. (It is conserved, as stated in the First Law of Thermodynamics.) Natural resources are used to make Mab`s chariot. She leaves the natural world and rides to the city where she visits members of the elite first (the lawyer, the parson, the courtiers, and ladies). What impels her to make this journey is the necessity of the humans she visits to eat (or, as we say, make a living): the lawyer “dreams on fees”, the parson “dreams on another benefice”, etc.

People need the energy in food to maintain life processes (or clothes and a house to maintain warmth, shoes to avoid cuts on the feet, etc.), and so stay alive, but in the process they dissipate energy (the energy used to produce the necessary food, clothing, etc.).⁵ By dissipating energy, they are fulfilling the Second Law of Thermodynamics (also called the Entropy Law). Shakespeare could not have known this law through science (the Entropy Law wasn`t put into words until 1865), but he seems to have intuited it, as this speech allegorically embodies its principles as they are worked out in a complex economy. The last part of the speech is focused on the lower socio-economic level: soldiers, “foul sluttish locks”, maids “on their backs”, and so on. Mab is suddenly a “hag”.

5 Edwin Schrodinger first described this process---at its root lies the 2nd Law of Thermodynamics--- in a famous 1943 lecture. I do not say that Shakespeare technically understood the science (including our modern concept of energy) behind the process he describes in the “Queen Mab” speech; Shakespeare seems to have grasped how the simple necessity to live meant that people had to participate in the complex economy on its (emergent) terms by working in more complex professions if they could.

Just as coal generated wealth and a larger and more glamorous, well-dressed, educated and sophisticated elite, it also meant a larger number of poor gathering in ever growing slums; these poor were generated by growing urbanization, also the result of coal use as wealthy landowners (also locked in social competition with each other) “enclosed” land (for use in sheep grazing to generate revenue from wool) previously used for rural people to grow food and these people were forced off the land and into the cities. To show the urbanizing process, *Romeo and Juliet* contains this revealing conversation between some servants in the Capulet household in Act I:

1stServ: Where`s Potpan, that he helps not to take away? He shift a trencher? he scrape a trencher?

2nd Serv.: When good manners shall lie all in one or two man`s hands, and they unwash`d too, `tis a foul thing.(Act I scene v, lines 1-4)

The quality of life was becoming difficult and dirty, with sharpening inequality between rich and poor. Clean water and clean hands would be for the rich.

Mercutio is an allegory for this irresistible force that compels us humans (animals cannot do this) to creatively use all different sorts of energy forms we may find. We can use different energy forms, not just the sun, so we will, and the later consequences, perhaps disruptive or even destructive, may not be well understood: that is why Mercutio is so rash and so hot-headed. And he forces Romeo to come over to his side. The process actually takes centuries, and it is connected to our evolution, and our use of fire and tools, but Shakespeare----ingeniously---compressed it to a single moment.

Biophysical economics and “Virtue” and “Vice”

We can also examine Friar Lawrence’s first speech (an important lecture) and find in it significance for the theme of coal/sun economies:

The grey-ey`d morn smiles on the frowning night,
Check`ring the eastern clouds with streaks of light,
And fleckled darkness like a drunkard reels
From forth day`s path and Titan`s fiery wheels.
Now ere the sun advance his burning eye,
The day to cheer and night`s dank dew to dry,
I must up-fill this osier cage of ours
With baleful weeds and precious-juiced flowers.
The earth that`s nature`s mother is her tomb;

What is her burying grave, that is her womb;
And from her womb children of divers kind
We sucking on her natural bosom find:
Many for many virtues excellent,
None but for some, and yet all different.
O, mickle is the powerful grace that lies
In plants, herbs, stones, and their true qualities;
For naught so vile that on the earth doth live
But to the earth some special good doth give;
Nor aught so good but, strain'd from that fair use,
Revolts from true birth, stumbling on abuse.
Virtue itself turns vice, being misapplied,
And vice sometime by action dignified. (II.iii.1-30)

The whole speech sets out an environmental message of a closed system ("The earth that's nature's mother is her tomb/What is her burying grave, that is her womb") with material flowing from the earth as resources ("womb") through human hands and bodies, then back into the earth again as waste ("tomb") and there is also the idea of people and animals as dependent on these resources ("from her womb children of divers kind/We sucking on her natural bosom find"). The "womb"/"tomb" rhyme serves to underscore how the flow of materials is connected with the origin and disposal/composting of materials, through the earth.

The lines that obliquely but clearly set forth Shakespeare's doubts about the wholehearted embrace of coal use are lines 16-20: "in plants, herbs, stones, and their true qualities/ ...some special good doth give/ Nor aught so good but, strain'd from that fair use/ Revolts from true birth, stumbling on abuse". (my emphasis) "Stones" here may imply 'coal'; coals look like stones, and early users of coal thought it was "a sort of stone". (Freese 15)

The word "stumbling" includes the idea of *lack of intentionality*, another piece of the puzzle in the emergent economic system he wishes to characterize. Shakespeare clearly recognized that humans had good intentions when they lit a coal fire. The waste they generated was unintentional. To underscore the positive, well-intentioned nature of human actions he gives Romeo the important, stand-alone line: "*I thought all for the best*" (italics mine) (III,i,104), at the turning point in the tragedy (when the dying Mercutio asks Romeo, "why the devil came you between us? I was hurt under your arm?") (III, i,102-103). Humans act defensively and positively. Yet because they are essentially locked in eternal competition (symbolized by the "ancient" feud between the Capulets and Montagues which has no stated reason, in the same way that competition arose out of evolutionary processes that go back eons), the emergent result in an economy/ecology may be a disaster: "all are

punish'd" (V.iii, 295). At the end of Act II, scene iii (the beginning of the scene is Friar Lawrence's speech about "stumbling on abuse") Friar Lawrence says to Romeo, "Wisely and slow, they stumble that run fast" (II.iii.94), underscoring Shakespeare's cautionary stance towards haste when it comes to energy transitions: leaving the sun may bring problems later.

Shakespeare's own disguised, but nevertheless poetic "lecture" on resources and ecology (*Romeo and Juliet*) is both scholarly and comprehensive and is, like Friar Lawrence's opening speech a sort of treatise on material (coal) use/abuse: a major clue to the real theme of this play is Friar Lawrence's opening speech, which is a microcosm of the play. The play catalogues facets of the emergent economic structure---and does so also by using emergence in dramaturgy that comes about from interactions between past rituals, morality plays and present poetic styles and ideas:

The profound interaction between poetic imagination and theatrical technique, renewed and refined at almost every level, serves, in Shakespeare, as a mode and a medium of perceiving and comprehending the world as a temporal, spatial and social experience. (Weimann 223)

The ability of Shakespeare to produce an experience for the audience of "participating in a common cultural and social activity" (Weimann 223) comes from the underlying thematic message, deployed throughout the play in diverse ways, but structurally a unified one, which was examining the social, economic, *human* pressures related to coal use that *entangled* the Elizabethans, *whether or not they knew it or wished it otherwise*.

Why did Shakespeare place---although discreetly--- his insights on economics and society in an emotional play about young love? The two streams of thought, romantic infinite love and cold-hearted ecological limits create a sort of polar opposition. Reconciling these two messages—one of physical limitation placed on us by ecology, the second of infinite ambition, desire and love--- is perhaps impossible. Populations (of all sorts of creatures) seem to naturally grow to the limits of available resources---and young love obviously plays a part in this process. Shakespeare perhaps alludes to the important issue of population growth when Lady Montague says to Juliet:

Well, think of marriage now; younger than you,
Here in Verona, ladies of esteem,
Are made already mothers. By my count,
I was your mother much upon these years
That you are now a maid. (I.iii.68-73)

"Who are the elites?"

Freese writes, "By 1600, London's population had reached nearly 200,000, nearly twice that of fifty years earlier, and it was still picking up speed...The size of the city allowed for increasing professional specialization prompting the development of commercial, financial, legal, and educational institutions" (Freese 37). Due to coal, England was in the process of evolving into a "world commercial power" (Freese 37), and London drew the educated and talented who formed a powerful elite class. In *Romeo and Juliet*, Shakespeare characterizes the role of the elites within the economic process. He shows a short conversation between Romeo and the Capulet servant, who cannot read the invitation list that Old Capulet has just given him:

Servant: Find them out whose names are written here!..... I am sent to find those persons whose names are here writ, and can never find what names the writing person hath here writ. I must to the learned. In good time!

(enter Benvolio and Romeo)

.....

Serv.: God gi` god-den. I pray sir, can you read?

.....

Romeo: Ay, if I know the letters and the language.

Serv.: Ye say honestly, rest ye merry!

Romeo: Stay, fellow, I can read. (I,ii,38-44, 57-63)

Nicholas Georgescu-Roegen, the "father of biophysical economics" also points out the importance of literacy in his discussion of elites in his seminal 1971 work, *The Entropy Law and the Economic Process*:

It is important also to know where elites arise from. Georges Sorel's opinion that every revolution means "the replacement of some intellectuals with other intellectuals" is certainly off the mark. It does nonetheless open our eyes to one fact. From the beginning of civilization every elite has included some literati, in the strict sense of the word; in the broadest sense, it has only consisted of the literati. (Georgescu-Roegen, 312)

By their talent and intelligence (symbolized by literacy—this gives them problem-solving powers), elites have the power to direct energy and material flows and this power makes them valuable and gives them their status.

Conclusion

“When you conform yourself to the celestial forms, ‘you will arrive from the confused plurality of things at the underlying unity’. For when the parts of the universal species are not considered separately but in relation to their underlying order----what is there that we may not understand, memorise and do?” (Bruno, qtd in Yates GBHT, 219) Taken from Bruno’s *Operelatine*, these words express Bruno’s underlying vision of unity in the universe (the underlying order) and this idea gives us the power to finally understand *Romeo and Juliet* as an expression of an underlying order also, an economic system on a certain planet in a certain cosmos---ours. Despite the last tragic scene in the tomb, the line “Juliet is the sun” retains its power, two-fold: still as the famous metaphor (as “pedant language”) for Juliet’s beauty, and now, as a secret door, open to a past solar-based way of life (as “language in magical contact with reality”) that, in Shakespeare’s adulthood, was becoming increasingly remote as coal replaced wood, while the resulting complexity and industry and science and urbanization and the enclosure acts saw the modern era---our own modern era--- get its start. Moreover, (the question is irresistible) is Shakespeare’s secret, startling and bold prediction (it remains a prediction) correct: *will humanity indeed follow a purely solar budget again someday?*

Finally, another prediction, Dame Yates’ own prophecy, may be fulfilled:

An entirely new approach to the problem of Bruno and Shakespeare will have to be made. The problem goes very deep and must include the study in relation to Bruno, of Shakespeare’s profound preoccupation with significant language, language which “captures the voices of the gods”---to use one of Bruno’s marvelous expressions----as contrasted with pedantic or empty use of language. (Yates GBHT 391-2)

We may come to see Shakespeare’s language---in all of his plays, not just *Romeo and Juliet*, differently in the future. We will see the operations of the cosmos embedded in language that significantly captures and explores the essence of humanity’s material---and the resulting spiritual--- position in this cosmos. In fact, it is *my* prediction that this will surely come to pass.

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