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The Hybrid Nature of Literary-Technical Works: Analyses of Selected Texts and an Approach to Translating in This Twofold Domain

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Abstract: This article focuses on the analyses of selected texts by the artists Gwen Frostic and James Whitcomb Riley. Their works are found to contain a high number of biological terms, which lend themselves to a translation approach that is tailored to both their technical requirements and the literary nature of their works. The article further seeks to analyze the hybrid nature of these literary-technical works and to highlight the importance of a biological database for the production of context-specific target-language terms.

Keywords: free verse; lyrics; specialized language; database; hybrid texts; technical translation

Contents:

1 Background

In a research project under the guidance of Prof. Dr. J. Kornelius that focused on the analysis and translation of the free verse written by Michigan artist Gwen Frostic, preliminary studies have highlighted the significant number of botanical and zoological terminology in her literary work, leading to the assumption that these poetic works are marked by specialized language and thus can be classified as technical-literary hybrid texts.

Gwen Frostic (1906–2001) created a twenty-two volume oeuvre in which she described the nature of her home state Michigan in minute detail, outlining complex natural processes in an easy-to-understand way that allows a wide reading audience to be taken on a journey through Michigan's nature while gaining insights into her philosophical views. In doing so, she employed an immense number of botanical and zoological terms, thus marking her poetic works with a notable technical quality. This perceived technicality is supported by extensive botanical and zoological field studies that Gwen Frostic conducted, as well as the extensive collection of scientific volumes housed in her personal library (Hensel 2009, Rouzbehani 2013).

These preliminary findings naturally led to the question whether hybrid texts that feature both literary content and specialized language, such as the Gwen Frostic works, could be translated similarly to technical texts using a CAT tool and a terminology database.

2 On the Hybrid Nature of the Gwen Frostic Works

Since Gwen Frostic's free verse is clearly marked by biological terminology, the question arises how closely this free verse lies to technical texts, and whether a significant difference from general-language texts can be shown that would warrant a classification of Frostic's works among the ranks of other technical texts.

For this purpose an empirical study of three Gwen Frostic works (*Ruminate*, *These Things Are Ours*, and *To Those Who See*) was conducted, based on the findings of S. Halkiopoulou (2006), which concludes that general texts are comparably rich in collocations, whereas technical texts contain relatively few collocations. Accordingly, if few collocations were contained in Frostic's works, these free-verse works could be considered more closely aligned to technical texts; conversely, locating numerous collocations in her work would indicate an affinity to general texts.

2.1 Extracting Collocations and Classifying Frostic's Works

To gain insights about the technicality of Frostic's works, the collocations and constructions (Hausmann 1999, Holderbaum 2003) or grammatical and lexical collocations (Benson, Benson and Ilson 1986) of the above-mentioned three literary volumes were identified and verified with the assistance of the *Oxford Collocations Dictionary for students of English* and the *Student's Dictionary of Collocations*.

F.-J. Hausmann distinguishes the following six types of collocations (headwords emphasized):

1. verb + **noun** (object)
2. adjective + **noun**
3. **noun** (subject) + verb
4. noun + (preposition) + **noun**
5. adverb + **adjective**
6. **verb** + adverb

(Hausmann 1999: vii)

The results of the empirical analyses of *Ruminate* (Frostic 1997), *These Things Are Ours* (Frostic 1960), and *To Those Who See* (Frostic 1965) are summarized in the following table:

	Ruminate	***These Things Are Ours***	***To Those Who See***
Nouns from flora and fauna	11.79% (of all nouns)	20.12% (of all nouns)	14.29% (of all nouns)
Nouns from nature	37.31% (of all nouns)	50.62% (of all nouns)	55.36% (of all nouns)
Words as part of collocations	15.28% (of all words)	13.21% (of all words)	15.75% (of all words)

Table 1: Summary of the Text Analyses

To determine whether these results point toward general or technical texts, three texts (one general text and two technical texts) were used for comparison:

	Text 1: general (extract of a news article)	**Text 2: technical (extract of a biological informational text)**	**Text 3: technical (extract of a patent)**
Collocations	23.53% (of all words)	13.38% (of all words)	10.50% (of all words)

Table 2: Collocations of the Texts Used for Comparison

The results of the text analyses clearly indicate a tendency of Frostic's free verse toward the domain of technical texts: In regard to the overall number of collocations found in the respective texts, the literary texts are located somewhere between the two technical texts and the general text; however, showing a closer proximity to both the biological informational text and the patent extract. To determine if the difference in the number of collocations among the various texts is significant and if the collocation rate is independent of or associated with the level of language (general/technical), a number of *chi-square tests* were conducted on the basis of G. Schneider's explanatory notes (w[1]).

First, the general text and the two technical texts were analyzed by means of the *chi-square test* to establish a basis for the classification of the literary texts and to confirm the findings of S. Halkiopoulou:

	***Chi-square test* for Text 1 (general) and Text 2 (technical)**	***Chi-square test* for Text 1 (general) and Text 3 (technical)**	***Chi-square test* for Text 2 (technical) and Text 3 (technical)**
Results	$X^2 = 15.53$; df = 1, significance 0,01 ($X^2 > 6.64$)	$X^2 = 25.99$; df = 1, significance 0.01 ($X^2 > 6.64$)	$X^2 = 3.01$; df = 1, significance 0.05 ($X^2 < 3.84$)
The difference is	significant	significant	insignificant

Table 3: *Chi-Square Tests* for Texts 1, 2, and 3

The *chi-square tests* conducted for Texts 1, 2, and 3 yield a relationship between the collocations identified in each of the texts and the level of language (general/technical). On the one hand, this confirms S. Halkiopoulou's findings that general texts are comparably richer in collocations than technical texts. On the other hand, these results provide a basis for classifying Gwen Frostic's free verse and empirical examples to which the literary texts must show a close proximity in order to be recognized as *also technical* rather than *solely literary*.

While we have established that a *chi-square test* for two technical texts results in no significant difference, a *chi-square test* for a general text and a technical text does show a significant difference, and we can assume that a *chi-square test* for the literary works and the general and technical texts, respectively, will provide an approximation of the level of language associated with the works of Gwen Frostic. No significant difference between the free verse and the technical texts, coupled with a significant difference between the free verse and the general text would support the assumption that the Gwen Frostic works can be regarded as *also technical*. For this purpose, a number of *chi-square tests* were conducted:

	***Chi-square test* for *Ruminate* and Text 1 (general)**	***Chi-square test* for *Ruminate* and Text 2 (technical)**	***Chi-square test* for *Ruminate* and Text 3 (technical)**
Results	$X^2 = 11.61$; df = 1, significance 0.01 ($X^2 > 6.64$)	$X^2 = 1.87$; df = 1, significance 0.05 ($X^2 < 3.84$)	$X^2 = 9.84$; df = 1, significance 0.01 ($X^2 > 6.64$)
The difference is	significant	insignificant	significant

Table 4: *Chi-Square Tests* for *Ruminate* and Texts 1, 2, and 3

	***Chi-square test* for *These Things Are Ours* and Text 1 (general)**	***Chi-square test* for *These Things Are Ours* and Text 2 (technical)**	***Chi-square test* for *These Things Are Ours* and Text 3 (technical)**
Results	$X^2 = 19.02$; df = 1, significance 0.01 ($X^2 > 6.64$)	$X^2 = 0.02$; df = 1, significance 0.05 ($X^2 < 3.84$)	$X^2 = 3.26$; df = 1, significance 0.05 ($X^2 < 3.84$)
The difference is	significant	insignificant	insignificant

Table 5: *Chi-Square Tests* for *These Things Are Ours* and Texts 1, 2, and 3

	***Chi-square test* for *To Those Who See* and Text 1 (general)**	***Chi-square test* for *To Those Who See* and Text 2 (technical)**	***Chi-square test* for *To Those Who See* and Text 3 (technical)**
Results	$X^2 = 9.59$; df = 1, significance 0.01	$X^2 = 2.58$; df = 1, significance 0.05 (X^2	$X^2 = 10.82$; df = 1, significance 0.01

	($X^2 > 6.64$)	< 3.84)	($X^2 > 6.64$)
The difference is	significant	insignificant	significant

Table 6: *Chi-Square Tests* for *To Those Who See* and Texts 1, 2, and 3

All three literary texts show a significant difference from the general text in regard to collocations and no significant difference from Text 2, one of a technical nature. *Ruminate* and *To Those Who See*, however, also show a significant difference from Text 3 – also of technical nature. The fact that *Ruminate* and *To Those Who See* show significant differences from Text 3 does not, however, mean that they cannot be regarded as technical at all; they both do, after all, show no significant difference from Text 2. *These Things Are Ours*, in contrast, shows no significant difference from either of the technical texts, and can thus be regarded as the literary work with the strongest technical marking. This conclusion is supported by the number of specialized terms (flora-and-fauna-related terms) found in the three respective literary texts: Of the three works considered, *These Things Are Ours* contains the highest number of flora-and-fauna-related terms (see Table 1). The study does not intend to assign different degrees of technicality to the various texts, but rather seeks to support the idea that the literary works in question are technically marked. In summary, all three literary texts can be associated with technical texts and be regarded as *also technical*.

2.2 An Analysis of Gwen Frostic's Terminology and the Importance of a Biological Database

Gwen Frostic's free verse is intended for a broad audience; the reader is introduced to Michigan's nature and its complex processes by means of easily comprehensible, philosophical language. Further, the author employs an enormous number of biological terms that contribute to the technicality of her works. To adequately translate these technical-literary hybrid texts, the translator must thus have an extensive knowledge of taxonomy.

An extraction of the flora-and-fauna-related biological terms found in the three works indicates that Gwen Frostic predominantly uses suffixes of various taxa, as well as terms that constitute taxa themselves, such as species or genera.

Translational issues arise for several reasons: Experts generally communicate using the designated scientific names of plants and animals. Since these scientific terms are used internationally, common names that are accompanied by their scientific names can be efficiently translated by looking up the scientific name and locating the corresponding common name in the target language. For example, when translating a text that describes the *surf scoter*, *Melanitta perspicillata* (w[2]), the English-to-German translator would look up *Melanitta perspicillata* and find the German common name *Brillenente* (w[3]). Scientific terms, however, cannot be easily integrated into literary works, and therefore are not used in Frostic's free verse. The translational difficulty that arises from this is not that the translator now has to go the extra mile of finding the scientific name corresponding to the common name to then search for the equivalent in the target language. Rather, the problem the lack of scientific names poses is that *one* common name can have *several* scientific names, leaving the translator to guess which species the author intended.

Another difficulty arises because Frostic uses a large number of suffixes, either of species or of higher taxa, and while these suffixes may comprise several species in English, such species may have different suffixes in the target language, rendering a uniform translation of the suffix in question impossible. The English term *chat*, for example, is the suffix of numerous species and cannot be translated by one single term in German without further context:

English	*German*
palm chat	Palmenschwätzer
familiar chat	Rostschwanz
karoo chat	Bleichschmätzer
sicklewing chat	Veldschmätzer
moorland chat	Almenschmätzer
tractrac chat	Oranjeschmätzer
white-crowned robin chat	Schuppenkopfrötel
olive-flanked robin chat	Olivflankenrötel
Archer's robin chat	Ruwenzorirötel
cape robin chat	Kaprötel

blue-shouldered robin chat	Blauschulterrötel
chorister robin chat	Spottrötel
white-headed robin chat	Weißkopfrötel
white-browed robin chat	Weißbrauenrötel
white-throated robin chat	Weißkehlrötel
mountain robin chat	Kamerunrötel
red-capped robin chat	Natalrötel
snowy-crowned robin chat	Weißscheitelrötel
white-bellied robin chat	Weißbauchrötel
Ruppell's robin chat	Braunrückenrötel
northern anteater chat	Rußschmätzer
white-fronted black chat	Weißstirnschmätzer
white-headed black chat	Arnotschmätzer
southern anteater chat	Termitenschmätzer
Ruppell's black chat	Einfarbschmätzer
sooty chat	Hadeschmätzer
herero chat	Hereroheckensänger
boulder chat	Steinspringer
farkas' robin chat	Bensonrötel
Madagascar robin chat	Dünenrötel
buff-streaked chat	Fahlschulterschmätzer
yellow-breasted chat	Gelbbrust-Waldsänger

Table 7: *Chat* as Suffix (w^4)

As Table 7 demonstrates, the English suffix *chat* can have several German translations, for example *Rötel*, *Waldsänger*, or *Schmätzer*. If the translator knows, however, that in Michigan there is only the *yellow-breasted chat* (w^2), which is called *Gelbbrust-Waldsänger* (w^3) in German, the term can then be translated adequately. Here the more specific translation with *Gelbbrust-Waldsänger* would be the adequate one, considering that in Michigan there are numerous species that carry the suffix *Waldsänger* in German but do not have the suffix *chat* in English:

Scientific Name	*English Common Name*	*German Common Name*
Familia: Parulidae (w5)	Family: New World warblers (w5), wood-warblers (w6)	Familie: Waldsänger (w3)
Genus: Dendroica (w5)	Genus: northern warblers (w5)	
Dendroica caerulescens (w2)	black-throated blue warbler (w2)	Blaurücken-Waldsänger (w3)
Dendroica castanea (w2)	bay-breasted warbler (w2)	Braunbrust-Waldsänger (w3)
Dendroica cerulea (w2)	Cerulean warbler (w2)	Pappelwaldsänger (w3)
Dendroica coronata (w2)	yellow-rumped warbler (w2)	Kronwaldsänger (w3)
Dendroica discolor (w2)	prairie warbler (w2)	Rostscheitel-Waldsänger (w3)
Dendroica dominica (w2)	yellow-throated warbler (w2)	Goldkehl-Waldsänger (w3)
Dendroica fusca (w2)	blackburnian warbler (w2)	Fichtenwaldsänger (w3)
Dendroica kirtlandii (w2)	Kirtland's warbler (w2)	Michiganwaldsänger (w3)
Dendroica magnolia (w2)	magnolia warbler (w2)	Magnolienwaldsänger (w3)
Dendroica nigrescens (w2)	black-throated gray warbler (w2)	Trauerwaldsänger (w3)
Dendroica palmarum (w2)	palm warbler (w2)	Palmenwaldsänger (w3)
Dendroica pensylvanica (w2)	chestnut-sided warbler (w2)	Gelbscheitel-Waldsänger (w3)
Dendroica petechia (w2)	yellow warbler (w2)	Goldwaldsänger (w3)
Dendroica pinus (w2)	pine warbler (w2)	Kiefernwaldsänger (w3)
Dendroica striata (w2)	blackpoll warbler (w2)	Streifenwaldsänger (w3)
Dendroica tigrina (w2)	cape may warbler (w2)	Tigerwaldsänger (w3)
Dendroica virens (w2)	black-throated green warbler (w2)	Grünwaldsänger (w3)
Genus: Geothlypis (w5)	Genus: yellowthroats (w5)	Gattung: Gelbkehlchen (w7)
Geothlypis trichas (w2)	common yellowthroat (w2)	Weidengelbkehlchen (w3)
Genus: Helmitheros (w5)	Genus: worm-eating warblers (w5)	
Helmitheros vermivorus (w2)	worm-eating warbler (w2)	Haldenwaldsänger (w3)
Genus: Icteria (w5)	Genus: chats (w5)	
Icteria virens (w2)	yellow-breasted chat (w2)	Gelbbrust-Waldsänger (w3)

Genus: Mniotilta (w[5])	Genus: black-and-white warblers (w[5])	
Mniotilta varia (w[2])	black-and-white warbler (w[2])	Kletterwaldsänger (w[3])
Genus: Myioborus (w[5])	Genus: painted redstarts (w[5])	
Myioborus pictus (w[2])	painted redstart (w[2])	Rotbrust-Waldsänger (w[3])
Genus: Oporonis (w[5])	Genus: mourning warblers (w[5])	
Oporornis agilis (w[2])	Connecticut warbler (w[2])	Augenring-Waldsänger (w[4])
Oporornis formosus (w[2])	Kentucky warbler (w[2])	Kentuckywaldsänger (w[8])
Oporornis philadelphia (w[2])	mourning warbler (w[2])	Graukopf-Waldsänger (w[9])
Genus: Parula (w[5])	Genus: parulas (w[5])	
Parula americana (w[2])	northern parula (w[2])	Meisenwaldsänger (w[3])
Genus: Protonotaria (w[5])	Genus: prothonotary warblers (w[5])	
Protonotaria citrea (w[2])	prothonotary warbler (w[2])	Zitronenwaldsänger (w[3])
Genus: Seiurus (w[5])	Genus: ovenbirds (w[5])	
Seiurus aurocapillus (w[2])	ovenbird (w[2])	Pieperwaldsänger (w[3])
Seiurus motacilla (w[2])	Louisiana waterthrush (w[2])	Stelzenwaldsänger (w[3])
Seiurus noveboracensis (w[2])	northern waterthrush (w[2])	Drosselwaldsänger (w[3])
Genus: Setophaga (w[5])	Genus: redstarts (w[5])	Gattung: Schnäpperwaldsänger (w[10])
Setophaga ruticilla (w[2])	American redstart (w[2])	Schnäpperwaldsänger (w[3])
Genus: Vermivora (w[5])	Genus: vermivoras (w[5])	
Vermivora celata (w[2])	orange-crowned warbler (w[2])	Orangefleck-Waldsänger (w[3])
Vermivora chrysoptera (w[2])	golden-winged warbler (w[2])	Goldflügel-Waldsänger (w[3])
Vermivora peregrina (w[2])	Tennessee warbler (w[2])	Brauen-Waldsänger (w[3])
Vermivora pinus (w[2])	blue-winged warbler (w[2])	Blauflügel-Waldsänger (w[3])
Vermivora ruficapilla (w[2])	Nashville warbler (w[2])	Rubinfleck-Waldsänger (w[3])
Genus: Wilsonia (w[5])	Genus: hooded warblers (w[5])	
Wilsonia citrina (w[2])	hooded warbler (w[2])	Kapuzenwaldsänger (w[3])
Wilsonia pusilla (w[2])	Wilson’s warbler (w[2])	Mönchswaldsänger (w[3])

Wilsonia canadensis (w2)	Canada warbler (w2)	Kanadawaldsänger (w3)

Table 8: Michigan *Warblers*

Because of the literary nature of her works, Frostic uses common names or suffixes thereof, a kind of general-language terminology, but she does so in a technical context, and a bilingual dictionary is often insufficient for locating adequate, context-specific translations for these terms.

For example, the translation provided by *Muret-Sanders* for the term *warbler* is *Grasmücke*. *Brockhaus multimedial* provides the following definition for *Grasmücken*: "Sylvia, Singvogelgattung in den gemäßigten Zonen Europas, Asiens und Nordafrikas." Because *Grasmücken* do not exist in Michigan, the term would not constitute an adequate translation of *warbler*. The definition of *warbler* provided by *Merriam-Webster* sheds light on this dilemma: "a. any of numerous small chiefly Old World oscine birds (family *Sylviidae*). b. any of numerous small brightly colored American oscine birds (family *Parulidae*)." The family *Sylviidae* contains *Old World birds*, suggesting the likelihood that the species of this family are not distributed in the United States, and that this family and consequently the genus *Sylvia* do not exist in Michigan, as shown in a distributional checklist of Michigan birds (w2). The family *Parulidae*, however, does exist in Michigan, and the English common name is *New-World warblers* or *wood-warblers*, with the German translation *Waldsänger* (see Table 8). Although the German suffix *Waldsänger* does include species that have other suffixes in English – but do belong to the family *Parulidae* – the translation of *warbler* with *Waldsänger* is appropriate because the term is not only a suffix of various species but also the name of the family *Parulidae*, the *(wood-)warblers*. This demonstrates that the translator can find adequate translations not only by regarding the suffix, but also by considering a higher taxon if the target-language suffix would include either a greater or a smaller number of species than the source-text suffix. This illustration also emphasizes the importance of finding context-specific translations, rather than relying on generalized terminology.

The Gwen Frostic works contain specialized terminology relating to the flora and fauna of Michigan, and thus its translation involves full consideration of this technical aspect. The term *butterfly*, for example, is translated as *Schmetterling* in a general-language context, and so someone in love may be said to have “butterflies in his or her stomach” or “Schmetterlinge im Bauch.” But although this translation may be idiomatically correct, *technically* it is incorrect. *Butterflies* are part of the order *Lepidoptera*, which includes *butterflies and moths*, and has the German translation *Schmetterlinge*:

Scientific Name	*English Common Name*	*German Common Name*
Ordo: Lepidoptera (w[11])	Order: butterflies and moths (w[11])	Ordnung: Schmetterlinge (w[12])

Table 9: *Lepidoptera*

As Table 9 shows, a translation of *butterfly* with *Schmetterling* would not be appropriate in a technical context. The German term *Schmetterling* comprises all species of the order *Lepidoptera* and includes both *butterflies* and *moths*. Because *butterflies* only constitute a part of this order, a translation of *butterfly* with *Schmetterling* would be too general. Of course, one could argue that such translation would not be incorrect, because every *butterfly* is indeed a *Schmetterling*, though notably not every *Schmetterling* is a *butterfly*. By logical extension, every *dog* is an *animal* (*Tier*), yet the word *animal* would be considered an inadequate translation of the word *dog*. The term *butterfly* defines a group of species, which is called *Diurna* or *Rhopalocera* (Scott 1992: 199) and has the German translation *Tagfalter* (w[13]). The terms *butterflies* and *Diurna* designate the species of the superfamilies *Papilionoidea* and *Hesperioidea* (Scott 1992: 199), i. e. the species that fly by day, called *Tagfalter* in German (w[13]). As a synonym for *Tagfalter*, *Brockhaus multimedial* also offers the term *Tagschmetterling*. If the literary translator still chooses to use the term *Schmetterling* for *butterfly*, then a verification process, such as the one illustrated here, will at least ensure that the decision is made with knowledge of the biological context and is not the result of a lack of taxonomic-lexical competence or of guessing.

Another example of how important it is to consider the specific context of Gwen Frostic’s works is the translation of the term *squirrel* that is mentioned in *Ruminate* (Frostic 1997). There are four *squirrel* species in Michigan:

Scientific Name	*English Common Name*	*German Common Name*
Subordo: Sciuromorpha (w[5])	Suborder: squirrels, dormice, and relatives (w[5])	Unterordnung: Hörnchenverwandte (w[14])
Familia: Sciuridae (w[5])	Family: squirrels (w[5])	Familie: Hörnchen (w[14])
Subfamilia: Sciurinae (w[5])	Subfamily: tree squirrels, flying squirrels, and relatives (w[5])	Unterfamilie: Echte Hörnchen (w[14])
Tribus: Pteromyini (w[5])	Tribe: flying squirrels (w[5])	Tribus: Gleithörnchen (w[15])
Genus: Glaucomys (w[5])	Genus: American flying squirrels (w[5])	Gattung: Neuweltliche Gleithörnchen (Wrobel 2007: 200)
Glaucomys sabrinus (w[16])	flying squirrel (w[16])	Nördliches Gleithörnchen (Wrobel 2007:349)
Tribus: Sciurini (w[5])	Tribe: tree squirrels, red squirrels, and relatives (w[5])	Tribus: Baumhörnchen (w[17])
Genus: Sciurus (w[5])	Genus: tree squirrels (w[5])	Gattung: Eichhörnchen (w[14])
Sciurus carolinensis (w[16])	gray squirrel (w[16])	Grauhörnchen (w[18])
Sciurus niger (w[16])	fox squirrel (w[16])	Fuchshörnchen (w[19])
Genus: Tamiasciurus (w[5])	Genus: American red squirrels and chickarees (w[5])	Gattung: Rothörnchen (w[20])
Tamiasciurus hudsonicus (w[16])	red squirrel (w[16])	Gemeines Rothörnchen (w[21])

Table 10: Michigan *Squirrels*

As Table 10 shows, the term *squirrels* stands for the family *Sciuridae*, which has the German translation *Hörnchen*. *Squirrel* is also the suffix of the species shown in said table. The suffix of the German common names of these species is also *Hörnchen*. Bilingual dictionaries suggest the term *Eichhörnchen* as a translation of *squirrel*, but this term would only comprise the *tree squirrels*, and would not only be more specific than the source-text term but could also be incorrect if the author did not intend the term to be limited to *tree squirrels*. *Ruminate* also features a linoleum print (Figure 1) that points to the species *Glaucomy sabrinus*, the *flying squirrel*, which has the German translation *Nördliches Gleithörnchen*.

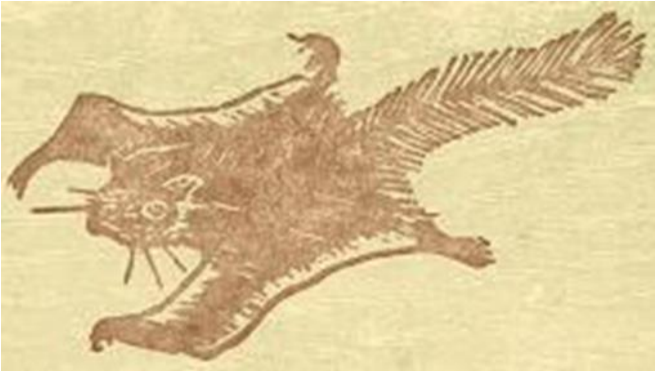

Figure 1: *Squirrel* (Frostic 1997)

Hörnchen is thus an adequate translation that is neither more general nor more specific than the source text, and which further does not limit the target-language perception to species that were likely not intended by the author.

The above examples illustrate the importance of accessing a trilingual species database with flora-and-fauna terms that empower the translator to find adequate and context-specific target-language terminology in this realm of literary-technical hybrid texts.

2.3 Establishing a Process For Translating Frostic's Flora-and-Fauna Terminology

While translating Frostic-terminology, a unique process evolves. Ideally, the translations should be as specific or as general as the source-text terms, and while locating appropriate terms is generally feasible for the Frostic works used in this analysis, the search-process tends to require a multi-step process. This translational search process is displayed in Figure 2:

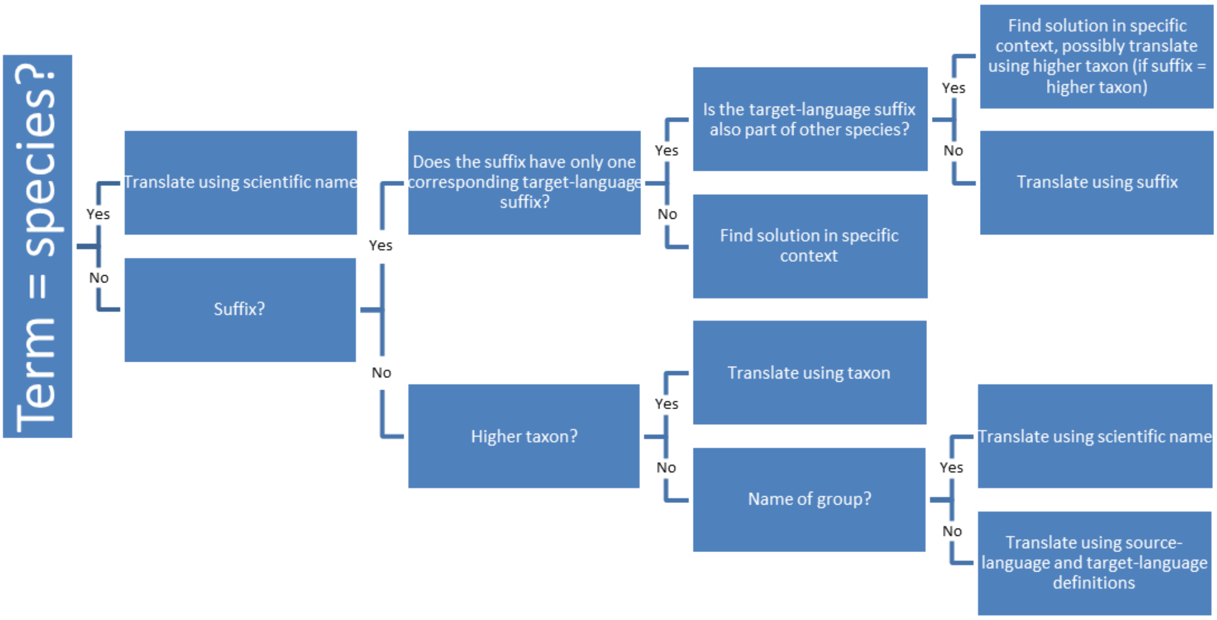

Figure 2: Process for Finding Corresponding Target-Language Terms

While most terms can be translated with a term that is neither more specific nor more general than the source-text word, some terms will comprise either more or fewer species than the source term. This requires the translator to select a translation that is most acceptable or closest to the meaning of the source-text term. A single correct solution is not the goal, but rather locating the translation that is most adequate in a specific context. This means that not every *Schmetterling* is a *butterfly*, yet at the same time no one should ever have *butterflies and moths* in his or her stomach.

3 James Whitcomb Riley's Lyrics

To find adequate translations for the flora-and-fauna terminology contained in the Gwen Frostic works *Ruminate*, *These Things Are Ours*, and *To Those Who See*, a trilingual database was created that contains scientific names as well as both English and German common names for Michigan's flora and birds and also for select species of this state's insects, reptiles, mammals, and ray-finned fishes. The next step was then to test if this database could also be used for the translation of works by another author from a geographically similar location: early twentieth-century prose written by the "Hoosier Poet," James Whitcomb Riley, from the nearby state of Indiana.

3.1 Poems Used for the Empirical Studies

To test the efficiency of the biological database that had been created, extracts from two of Riley's poems were selected: *Knee-Deep in June* (Riley 1993: 353ff.) and *The Rose* (Riley 1993: 77f.). Similarly to the analysis of Gwen Frostic's works, these two poems were also compared to a general and two technical texts by means of *chi-square tests*:

	***Chi-square test* for *Knee-Deep in June* and Text 1 (general)**	***Chi-square test* for *Knee-Deep in June* and Text 2 (technical)**	***Chi-square test* for *Knee-Deep in June* and Text 3 (technical)**
Results	$X^2 = 9.19$; df = 1, significance 0.01 ($X^2 > 6.64$)	$X^2 = 0.56$; df = 1, significance 0.05 ($X^2 < 3.84$)	$X^2 = 5.09$; df = 1, significance 0.05 ($X^2 > 3.84$), significance 0.01 ($X^2 < 6.64$)
The difference is	significant	insignificant	significant on the 5% level and insignificant on the 1% level

Table 11: *Chi-Square Tests* for *Knee-Deep in June* and Texts 1, 2, and 3

	***Chi-square test* for *The Rose* and Text 1 (general)**	***Chi-square test* for *The Rose* and Text 2 (technical)**	***Chi-square test* for *The Rose* and Text 3 (technical)**
Results	$X^2 = 10.39$; df = 1, significance 0.01 ($X^2 > 6.64$)	$X^2 = 0.02$; df = 1, significance 0.05 ($X^2 < 3.84$)	$X^2 = 1.39$; df = 1, significance 0.05 ($X^2 < 3.84$)
The difference is	significant	insignificant	insignificant

Table 12: *Chi-Square Tests* for *The Rose* and Texts 1, 2, and 3

Both of Riley's texts thus show a technical marking, which makes them ideal for testing the efficiency of the biological database.

3.2 Empirical Studies with Riley's Texts

Having selected two of Riley's poems for the empirical translation studies, the database was extended to also include the flora and fauna of Indiana for the translation of the terms contained in the two extracts from Riley's texts.

The two extracts from *Knee-Deep in June*, one of Riley's dialect texts, and *The Rose*, one of his more traditional poems, were then assigned to various student translators for translation within a specified timeframe in the following four scenarios:

1. Translation by one single translator without access to the database
2. Translation by a cooperative group of translators without access to the database
3. Translation by one single translator with access to the database
4. Translation by a cooperative group of translators with access to the database

These experiments provide insights into the efficiency of the database as well as an opportunity to compare translation in a cooperative group with more traditional individual translation.

The results of the experiments are illustrated in Figures 3 and 4.

Since the participants have both differing experience levels and various language proficiencies, the resulting translations were evaluated solely on the basis of the amount of text translated and whether the most adequate translations for the biological terms were chosen. This further ensured that the focus was solely placed on the efficiency of the database, and not on the competence levels of the individual translators.

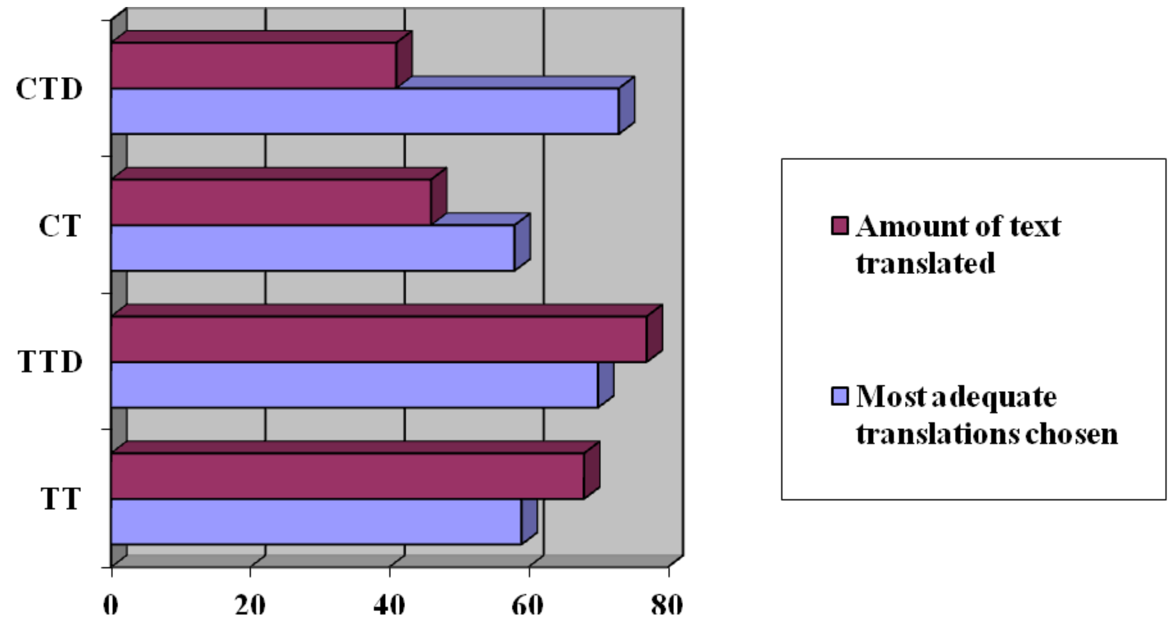

Figure 3: Evaluation 1

Figure 3 shows the percentage of adequate translations selected and of the amount of text translated. The traditional translation method (TT) shows an increase in the amount of text translated when the database is used (TTD), while the cooperative translation method (CT) indicates a decreased amount when the database is used (CTD). Considering that the students participating in cooperative translation were in their second semester, while those using traditional translation methods were more experienced students, this decrease can likely be attributed to inexperience with using the CAT tool in which the database was integrated. The graph also indicates that the cooperative groups translated less text than the traditional translation groups, which may be attributable to the cooperative groups needing to first become a unified team and to find their individual, dynamic workflow. The results also demonstrate that the use of the database leads to more adequate translation selections, such that flora-and-fauna terms were translated in a way that was neither more specific nor more general. While the traditional translation method with use of the database (TTD) proved to be most efficient in regard to the amount of text translated, the most adequate translations were chosen using the cooperative translation method with database accessibility (CTD).

Because the participating students were unaccustomed to the above-mentioned process of finding the "most adequate translations," and were not familiar with using suffixes, results were further evaluated to determine if the correct, not necessarily the most adequate, translations were selected (Figure 4) as long as these translations did not comprise more or fewer species. An example of this is the translation of the term *bobwhite*. *Bobwhite* is the name of the genus *Colinus* and also the suffix of a species that is found in Michigan and Indiana (Table 13). The German translation for the genus *Colinus* is *Baumwachteln* and the translation for the species is *Virginiawachtel*. According to the above-mentioned process for finding the most adequate target-language terms, the translation should be *Wachtel* (suffix of the species). Since there is only one *bobwhite* species in Indiana, using the species name or the genus name does not comprise more or fewer species, and thus the more specific translation *Virginiawachtel* or the more general term *Baumwachtel* is also not incorrect, and is thus acceptable.

Michigan	*Indiana*		
Genus: bobwhites (w[5])		Genus: Colinus (w[5])	Gattung: Baumwachteln (w[10])
northern bobwhite (w[2])	northern bobwhite (w[22])	Colinus virginianus (w[2])	Virginiawachtel (w[3])

Table 13: *Bobwhite*

The term *honey-bee*, however, could not be translated as *Biene* because, as a checklist of the *bees*/*Bienen* of Indiana shows, this translation would comprise more species than the term used in the source text: Indiana is not only home to *honeybees* but also to, for example, *squash bees* (see w[23]).

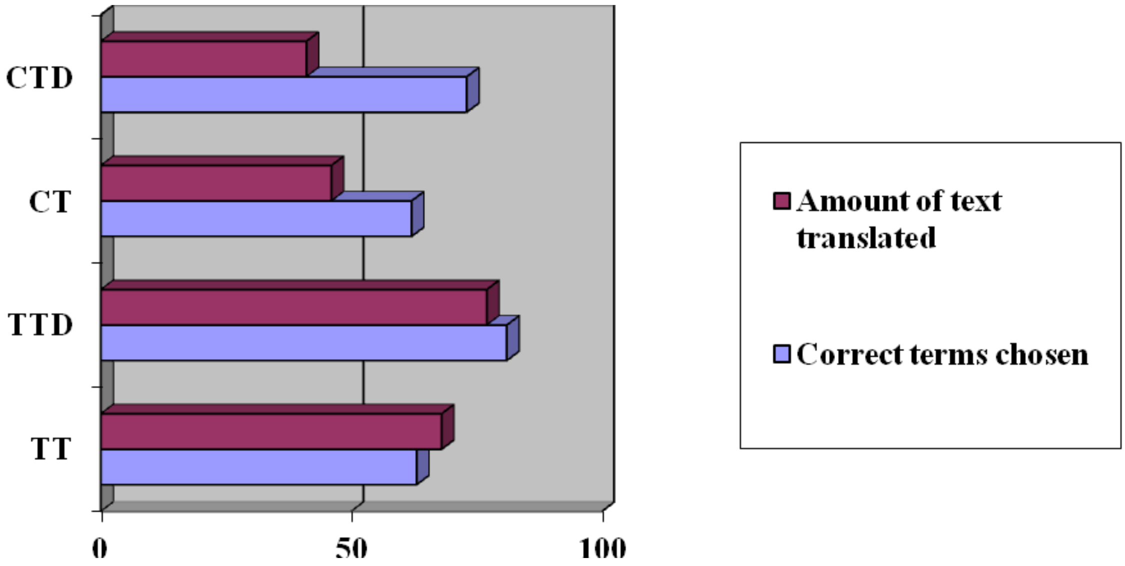

Figure 4: Evaluation 2

Figure 4 clearly demonstrates that more correct translations were chosen when the database was used. Here, the most text was translated and the largest number of correct terms were chosen by the students using the traditional translation method with database.

4 Conclusion

Analyses of the works of Gwen Frostic and James Whitcomb Riley have shown that these literary works have technical markings, and thus can be classified as hybrid, literary-technical texts. Since the works of both authors contain a high number of flora-and-fauna terms or suffixes thereof, they require a context-specific translation process that considers the species present in the geographical area in question, which then locates target-language equivalents that comprise the same species as the source-text terms. This calls for a trilingual database of species and higher taxa that provides the literary translator with a technical-biological resource. The efficiency of the database that was created for this purpose was tested in empirical studies that indicated clearly that integrating such a biological database can increase both translation speed and the use of context-specific, accurate target-language equivalents. In a professional translation environment, such a terminological database can be imported into the TM of a CAT tool and/or be included as an MS Word file to display the hierarchy of the respective biological taxa and thus facilitate the process of finding appropriate target-language terms based on the use of suffixes. By using a biological database for the translation of such literary works as those analyzed here, the translator can do the technical-biological aspect of these texts justice and produce a translation that is equivalent in function (Albrecht 1998) to the original as well as accurate in a technical sense. The biological database enables the literary translator to make informed decisions about terminology, while preserving his or her professional freedom of artistic choice.

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