Linking semantic roles and relationships to their surface alternation

This paper addresses the problem of linking semantic roles to their surface alternations. The focus is the medical domain and two semantic roles, TREATMENT and DISEASE. In particular, I am interested in the realizations of these roles when the relationship between them is “TREATMENT for DISEASE”, in other words, when the TREATMENT is meant to cure the DISEASE; I’ll call this relationship purpose. (These two roles can co-occur and have different relationships, for example side-effect).

One goal of this paper is to identify the lexical patterns that “connect” the roles TREATMENT and DISEASE in such a way that they univocally identify the relationship purpose. I tackle this in section 2.

In section 3, I discuss the evidence for the syntactic realizations for these thematic roles.

In this paper, I am mainly concerned with technical text (abstract from medical journals) but I also analyze the syntactic structures of the FrameNet sentences in the health domain.

1) Data Collections and Sentence Extraction

I analyzed sentences extracted from medical journals from Medline. Medline is a bibliographic database covering the fields of medicine, nursing, dentistry etc. and contains bibliographic citations and author abstracts from more than 4,300 biomedical journals. I extracted the sentences that had a TREATMENT and a DISEASE “nearby”. I didn’t consider sentences that have only TREATMENT or only DISEASE.

I did some of the extraction by hand but most of the sentences were extracted automatically; this is itself a very difficult problem. I used a simple heuristic: I mapped all the words to concepts of a medical ontology (MeSH) and I then considered only the

1 http://www4.ncbi.nlm.nih.gov/PubMed
2 Medical Subject Headings, http://www.nlm.nih.gov/mesh/meshhome.html
sentences that contained words that had been mapped to concepts that are TREATMENT and DISEASE accordingly to this ontology. I hand-checked the extracted sentences and did not consider sentences that were mistakenly extracted. The recall, however, may be low.

I am also interested in seeing whether there are major differences (and which ones) between the FrameNet sentences that are drawn from the British National Corpus and that therefore represent mainly “common” language with the sentences of the much more technical language of Medline.

In FrameNet there are 421 sentences in the health domain, 105 sentences with only AFFLICTION and no TREATMENT and 34 sentences with only TREATMENT and no AFFLICTION. I used the 53 sentences with TREATMENT and AFFLICTION (assuming that this means TREATMENT for AFFLICTION). In appendix B, I report all these 53 sentences.

In my analysis, I used only the sentences with TREATMENT for AFFLICTION in the medical sense; for example, I didn’t consider sentences like the following:

\[
\text{In Quattro Pro for Windows, Borland has alleviated *the problem* *with its “notebook spreadsheet" concept*.}
\]

\[
\text{From the mid-1970s successive governments attempted to alleviate *the crisis* *by curbing public expenditure*.}
\]

2) Semantic Relationships

There are different semantic relationships that TREATMENT and DISEASE can have. One is the purpose relation I am most interested in for this paper: some examples are the noun compounds:

headache medication, varicella vaccine, influenza drug, ulcer surgery, flu vaccination

MeSH is the National Library of Medicine's controlled vocabulary thesaurus. MeSH consists of a set of terms or subject headings that are arranged in both an alphabetic and a hierarchical structure. At the most general level of the hierarchical structure are very broad headings such as "Anatomy," "Mental Disorders," and "Enzymes, Coenzymes, and Enzyme Inhibitors." At more narrow levels are found more specific headings such as "Ankle", "Conduct Disorder," and "Calcineurin." There are more than 19,000 main headings in MeSH.

3 While there is a subhierarchy in MeSH for all diseases (see the MeSH Tree Structures in http://www.nlm.nih.gov/cgi/mesh/2K/MB_cgi), treatments are more loosely defined. For this paper, I consider TREATMENT as the terms found in the Chemicals and Drugs subtree (D) of MeSH, as the terms defined as Therapeutics (E02 subtree) and the terms falling under the E04 subtree (Surgical Procedures, Operative).

4 See http://www.icsi.berkeley.edu/~framenet/

5 In FrameNet, the term AFFLICTION is used for what I call DISEASE. Throughout the paper I will use the two terms interchangeably, using mainly AFFLICTION when I talk about FrameNet and DISEASE when I talk about the Medline sentences.

6 The stars delimit the constituents that have been labeled TREATMENT and AFFLICTION. Throughout the paper, I report the FrameNet sentences using this font and the Medline sentences using this other font.
and the following sentences:

the patient was a 62-year-old man with <DIS> squamous cell lung cancer </DIS>, which was first successfully treated by <TREAT> a combination of radiation therapy and chemotherapy </TREAT>

conclusion: there is excessive use of <TREAT> antimicrobial drug </TREAT> in <DIS> acute respiratory infection </DIS>, and the majority are used for viral infection.

Another is side-effect like in

We found that significantly higher incidence of <DIS> vomiting and pruritus </DIS> were observed with <TREAT> chloroquine </TREAT>, <DIS> dizziness, nausea and vomiting </DIS> with <TREAT> mefloquine </TREAT>, <DIS> somnolence </DIS> with <TREAT> pyrimethamine + sulfadoxine </TREAT>, and <DIS> vomiting and dizziness </DIS> with <TREAT> quinine </TREAT>

and the noun compounds

drug fever, amiodarone pneumonia, griseofulvin intoxication, insuline stress, catheter infection

We can also have misuse (misuse of a drug causes a disease), like in

acetaminophen overdose, drug overdose

and sensitivity to (how a person reacts to a specific drug), like in

antibiotic susceptibility, penicillin susceptibility

Misuse could actually also be considered a side-effect. The problem of identifying the right semantic relations is a difficult one and outside the scope of this paper; for this paper, I will consider mainly the relationship purpose.

3) Lexical Patterns for purpose

One goal of this paper is to identify the lexical patterns (if any) that “connect” the roles TREATMENT and DISEASE in such a way that they univocally identify the relationship purpose.

For example,

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7 The tags <DIS> <\DIS> etc. delimit the boundaries of the roles as I used them during the annotation. Not all the sentences that I report in this paper were hand-annotated, therefore some sentences won’t have the tags. It should be clear from the context what are the words that constitute the roles.

8 Where we assume that overdose is a DISEASE and drug a TREATMENT
the role of [TREATMENT] in the treatment of [DISEASE]

is a good pattern, in the sense that all the sentences that present this patterns have TREATMENT and DISEASE in the purpose relationship.

the role of surgery has been reappraised in the treatment of small-cell lung cancer which appears, nowadays, multidisciplinary

future studies will explore and better define the role of these drug combinations in the treatment of lung cancer

Other patterns are:

effective for [DISEASE] prevention and treatment

amantadine, rimantadine, and the newly available drugs zanamivir and oseltamivir are effective for influenza prevention and treatment

for the treatment of [DISEASE]

cisplatin or carboplatin for the treatment of non-small cell lung cancer: do they have equivalent efficacy?

study objective: to evaluate the usefulness of endobronchial argon plasma coagulation (apc) for the treatment of hemoptysis and neoplastic airway obstruction

In general, the more specific the pattern, the more precise the relationships. But we would like to find the most general patterns that univocally identify the relationship. For example, we saw that effective for [DISEASE] prevention and treatment is a good pattern and so is effective for preventing [DISEASE] but the pattern effective for [DISEASE] is too general, in the sense that it can be found in a purpose context like in:

one course of chronochemotherapy was effective for lymph node and peritoneum metastases

but also in other contexts, such as

9 For example:

the available inactivated vaccine is effective for preventing influenza and the serious disease and death that can accompany it
this vaccine is safe and effective for active immunization of children < 2 year of age against invasive disease caused by seven streptococcus pneumoniae serotype included in the vaccine

It could be pointed out that we do have a disease in the previous sentence (namely, invasive disease) but it’s not directly syntactically related with the pattern (active immunization is).

When I say: “univocally identify the relationship”, I mean that those semantic roles that are in a close syntactic relation with the pattern (within the clause boundary) are univocally defined to be in that relation. Other information across clause boundaries, or pragmatics, can change the nature of the relationship.

Another example along this line is

**the effect of [TREATMENT] on [DISEASE]**

that in the following example indicates a purpose relationship:

in the present study, to evaluate the effect of kampo medicine on chronic hepatitis c, clinical treatment was assessed in short-term and long-term study, and it was shown that ninjin-yoei-to (formula ginseng compositae: tj-108) was very effective

However, also, in the following example, we find the same pattern:

the effect of exercise on asthma may be many-sided

but if we read the whole abstract[^10] we realize that the relationship is more likely to be side-effect[^11].

It would be indeed very interesting to see how general reasoning or inter-clausal information can influence the disease-treatment readings and to analyze the limits of

[^10]: From an epidemiological point of view four issues are briefly emphasized here: the definition of asthma, time trends and regional differences, and risk factors for asthma. Furthermore, I will focus upon a few aspects regarding the relation between exercise and asthma. [...]The effect of exercise on asthma may be many-sided. Children with asthma can actively take part in sport. However, to what extent extensive exercise may affect the occurrence of bronchial responsiveness is unclear, and among athletes exercise may be a risk factor for the development of "athlete's asthma". [...] 

[^11]: It could be argued that exercise is not a “pure” treatment, but, in fact, exercise is used in the sense of TREATMENT in many medical abstracts. This is an example in which exercise is explicitly compared and associated with TREATMENT:

In this paper, the scientific basis for promoting exercise as treatment for mental disorders is evaluated on the basis of a review of the literature. RESULTS: Beneficial psychological effects of exercise are best documented for mild to moderate forms of unipolar depression and chronic fatigue syndrome; in these disorders, exercise is an alternative to traditional forms of treatment.
grammar for a semantic analysis of this kind. This is however outside the scope of this paper that focuses on more grammatically constrained cases.

The identification of the patterns that have these properties is still work-in-progress. The list of patterns I found so far can be seen in appendix A.

3) Syntactic valence of purpose

The subcategorization frame and argument-structure information analysis (Van Valin, page 157) defines the syntactic and semantic (thematic roles) argument-structures for the individual verbs. Here, I am doing something analogous but complementary: I want to define the syntactic structures and the range of possible verbs (and other words) for the two semantic roles under consideration. In other words, I am looking for the syntactic valence for these semantic roles, i.e. the syntactic ways in which the roles (in the purpose relationship) are realized (Frame Semantics, Fillmore).

I provide the tree structures for the constituents with the role realizations, indicating therefore subjects and complements; this analysis therefore can be considered analogous to HPSF-based representations of syntactic valence (page 79 handout), where, again, the “independent variables” are the thematic roles and not the verbs.

I analyzed all the sentences from Medline that were annotated by hand (about 50 sentences) and all the FrameNet sentences in the health domain with both TREATMENT and AFFLICTION in the medical sense.

I draw the tree structures for the smallest constituent that contains both thematic roles.

3.1) Noun Compounds

If DISEASE is followed by TREATMENT, we have purpose, like in

- influenza vaccine, varicella vaccine, tuberculosis drug, polio vaccine, asthma medication, pneumoniae antibiotic

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12 Two examples in which grammar is not enough for the semantic interpretation are the following:

to examine whether efficacy of postoperative oral administration of uft, a 5-fluorouracil derivative chemotherapeutic agent, may be influenced by incidence of apoptosis (apoptosis index) or apoptosis-related gene status (p53 and bcl-2) of the tumour, a total of 162 patients with pathologic stage i non-small cell lung cancer were retrospectively reviewed.

purpose: given the cisplatin-related myelotoxicity and nonhematologic toxicities, we were prompted to undertake a study of the noncisplatin combination of paclitaxel plus gemcitabine to evaluate the efficacy, tolerance, and survival of this combination in patients with locally advanced and metastatic non-small-cell lung cancer (nsclc)


14 I am actually not sure about this claim…Also, the formalism I use is different.
If TREATMENT is followed by DISEASE we have side-effect:

- drug fever, griseofulvin intoxication,
- amiodarone pneumonia, catheter infection

### 3.2) Clauses

DISEASE and TREATMENT appear at the clause level

#### 3.2.1) Clauses with the verb *be*

3.2.1.1

Where I follow Chomsky notation for the auxiliary\ref{15}.

- \(<TREAT>\) heparin and/or enoxaparin \(</TREAT>\) could be a potential treatment for patients with \(<DIS>\) radiation-induced myelopathy \(</DIS>\).
- \(<TREAT>\) tracheal stent insertion \(</TREAT>\) is a useful method for patients with \(<DIS>\) malignant tracheal stenosis \(</DIS>\).
- \(<TREAT>\) gemcitabine/carboplatin \(</TREAT>\) may be an active, safe, and acceptable treatment for patients with \(<DIS>\) extensive-stage and poor-prognosis small cell lung cancer \(</DIS>\).
- \(<TREAT>\) d-penicillamine (2-amino-3-mercapto-3-methylbutanoic acid) \(</TREAT>\) is the drug of choice in the treatment of \(<DIS>\) Wilson's disease \(</DIS>\).

\[15\text{ From now on, for simplicity, I won't always draw the auxiliaries in the trees.}\]
3.2.1.2

Same structure but with an adjectival phrase

- background: <TREAT> new antiviral drugs </TREAT> are available for the treatment of <DIS> influenza type a and type b </DIS> infections
- conclusions: <TREAT> apc </TREAT> is effective for the treatment of <DIS> endoluminal hemoptysis </DIS> and <DIS> airway obstruction
- our conclusion was that the <TREAT> covered-ems </TREAT> can be effective for the palliation of <DIS> esophagorespiratory fistulas </DIS>
- i concluded that 6-month regimen containing <TREAT> pyrazinamide </TREAT> was effective for the patients with <DIS> isoniazid-rifampicin susceptible tuberculosis </DIS>
ಆ at present the <TREAT> addition of thoracic irradiation to combination chemotherapy </TREAT> is a standard treatment for <DIS> limited staged small cell lung cancer </DIS>.

FrameNet

- *an operation* is often the only cure *for this painful condition*

> 3.2.1.4

Same structure with an adjectival phrase

ಆ <TREAT> cyclophosphamide therapy </TREAT> is effective for <DIS> bronchiolitis obliterans </DIS>
3.2.1.5

- <TREAT> influenza vaccination </TREAT> is effective for preventing <DIS> influenza disease </DIS> in persons aged 65 years and over
- <TREAT> liposomal mdp-lys </TREAT> was effective for inhibiting <DIS> lung metastasis </DIS>
- The most recent study, involving over 37,000 young children, also evaluated the vaccine's efficacy, and reported that the <TREAT> vaccine </TREAT> is highly effective in preventing <DIS> invasive disease </DIS>
- Cetazolamide was dramatically effective in alleviating myotonia in all patients.

FrameNet:
- Our study shows that "bfgf", even at a dose that did not affect gastric acid secretion (30 µg), was also effective in healing "these lesions"

3.2.2) Clauses with active verbs

DISEASE as direct object
FrameNet Sentences:
- the difficulty here is that "simple lack of stress" may also alleviate "the symptoms" -- so an improvement while on holiday may be a slightly ambiguous result.
- but some tablets were kindly provided and "they" did alleviate "the problem".
- surgeons are to start testing "a technique which" could cure "short-sightedness" in just 15 minutes.
- however, although "these drugs" heal "70-80 per cent of ulcers" within four weeks of treatment they do not cure the underlying disease.
- the injection is not a conventional vaccine as "it" treats "the infection" rather than being used as a preventive measure.

DISEASE as oblique argument
3.2.2.3

- 60-cm sigmoidoscope can reduce mortality from colorectal cancer

3.2.2.4

- these aggressive chemotherapeutic combinations will hopefully improve survival and quality of life for patients with advanced nsclc.
3.2.2.5

Thus, we should perform <TREAT> peri- and postoperative management </TREAT> for patients with <DIS> gh-producing tumors </DIS>.

3.2.2.6

FrameNet Sentences:

- there's a man down by the docks who claims he can cure "illness" "without medicine".
- we used to treat "our coral cuts" "with iodine", unaware that the coral polyps which had entered the wounds normally thrived on iodine which they extracted from seawater -- and were now extracting from our blood.
- to cure "their somnambulism" "with my words".

For:

- the man i went to cured "my hip" just "by stroking it", " sean said.

we have the same structure as above, where the last PP is replaced by a VP and where the TREATMENT is the whole VP

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16 I am not sure how to draw the tree structure of this FrameNet sentence, but it seems similar to structure 3.2.2.6, where the HEALER is not expressed.
3.2.2.7

- 19 patients with <DIS> nsclc </DIS> had got <TREAT> surgical treatment </TREAT> and one patient with <DIS> nsclc (stage iiib) </DIS> had received <TREAT> radiotherapy </TREAT>

3.2.2.8

- Patients with <DIS> radiation-induced spinal cord injury </DIS> may benefit from <TREAT> anticoagulant therapy </TREAT>
3.2.3) Clauses with passive verbs

➢ 3.2.3.1

For the following example, we have the same structure as above, where we replace a VP with the last PP:

\[
\text{VP} \rightarrow \text{V} \quad \text{NP(\text{TREATMENT})}
\]

- the abscess was successfully treated using antibiotics and percutaneous catheter drainage

➢ 3.2.3.2

For the following example, we have the same structure as above, where we replace a VP with the last PP:

\[
\text{VP} \rightarrow \text{V} \quad \text{NP(\text{TREATMENT})}
\]

- two patients with <DIS> sclc </DIS> were treated with <TREAT> chemo- and radiotherapy </TREAT>
forty-four patients with limited small cell lung cancer were treated with etoposide-ifosfamide-cisplatin and concurrent thoracic irradiation.

Again, same tree, with NP→NP PP(with DISEASE) instead of the first NP (DISEASE)

3.2.3.4

In the following examples, we have the same tree structures as above, with NP→NP PP(with DISEASE) instead of the last PP (P DISEASE)

3.2.3.5
3.3) Noun phrases

In the following examples, the smallest constituents containing “TREATMENT for DISEASE” are noun phrases.

➢ 3.3.1

NP

\[ \text{TREATMENT for, in DISEASE} \]

a 68-year-old man underwent <TREAT> curative pancreaticoduodenectomy </TREAT> for <DIS> bile duct cancer </DIS>

this <TREAT> conjugated vaccine </TREAT> against <DIS> pneumococcus </DIS> uses the same technology as the successful <TREAT> vaccine </TREAT> against <DIS> haemophilus influenzae type b </DIS>.

thirty-five (26%) patient received antibiotic for their acute bronchitis.

➢ 3.3.2

NP

\[ \text{TREATMENT with, of DISEASE} \]

radiation for patients with unresectable stage iii nsclc

whether the era of <TREAT> platinum-based chemotherapy </TREAT> in the treatment of <DIS> nsclc </DIS> should continue or not must be determined by phase iii trials

a phase ii study of fractionated administration of <TREAT> irinotecan ( cpt-11 ) and cisplatin ( cddp ) </TREAT> in patients with <DIS> non-small-cell lung cancer ( n sclc ) </DIS> was conducted

<TREAT> vip combination chemotherapy and early concurrent thoracic irradiation </TREAT> for patients with <DIS> limited stage small cell lung cancer </DIS> revealed excellent antitumor response with tolerable toxicity
Passive verb phrases as adnominal modifiers

FrameNet:

- folkman discovered that *tumours in rabbits' ears* treated *with protamine* grew much slower than untreated tumours.
the aim of the current study was to compare the objective response and survival rates of patients with \textit{mrcc} treated with \textit{il-2}.

long-term prognosis of patients with lung cancer treated by thoracic radiotherapy

\section*{3.3.6 Noun phrases with relative clauses}

```
NP
  N'         VP
    N'           V
        PP       NP
  patients with \textit{DISEASE} receiving
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```
NP
  N'
    N'       S'
      N'     PP   S
        COMP  who  V
          S
    patients with \textit{DISEASE} who underwent \textit{TREATMENT}
```

we retrospectively reviewed 14 patients with \textit{bos} who underwent \textit{therapy} with extracorporeal photopheresis.
Noun phrases with a predicative category (small clause complements)

3.3.8

> the availability of four antiviral agents that effectively prevent and treat influenza provides the physician with considerable flexibility for their use in influenza control.

3.3.9

> the effectiveness of pilocarpine in postradiation xerostomia and the effectiveness of analgesic medication for postsurgical pain was surveyed in a surgical ward of a large general hospital.

3.3.10

Like above, but with *for patients with DISEASE* instead of *for DISEASE*
the role of surgical staging of patients with non-small cell lung cancer (nsclc) continues to evolve.

we evaluated the role of systemic chemotherapy for patients with malignant pleural effusions from nsclc.

the benefit of whole-lung irradiation (wli) for patients with pulmonary metastases is unclear.

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3.3.11

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conclusions: the comparable survival of patients with poor and good response of pm to induction chemotherapy suggests that wli may benefit poor responders.

FrameNet:
- alternative medicine practitioners were accused by the royal college of physicians yesterday of making false and misleading claims for their treatments *of allergies* *by unorthodox methods*.

4) Discussion

I identified 5 trees structures for clauses with be: in all 5, the TREATMENT is the subject, and higher up in the trees than DISEASE.

For clauses with active verbs, I found 8 tree structures; TREATMENT is not always the subject (DISEASE is never the subject) but in 5 cases it’s the antecedent of the DISEASE and higher up in the tree. DISEASE is higher then TREATMENT only in one case: 3.2.2.6 and, although this can be a case, it’s interesting to note that for this structure we have only FrameNet sentences and none from Medline.

We have 5 trees for clauses with passive verbs, in 3 of which DISEASE is the antecedent (in 2 cases it’s the subject).

For noun phrases, I identified 11 trees structures, in 6 of which TREATMENT is the antecedent. DISEASE is higher in the tree only in 3.3.4 (where it’s the subject) and again, we have only FrameNet sentences for this case.

Another difference between FrameNet and Medline sentences is that the very simple structure in 3.2.2.1 appears only for FrameNet sentences. In 3.2.2.1, DISEASE is the direct object of the transitive verb. The same happens in 3.2.2.6 for which again we don’t have Medline sentences (only in 3.2.2.2 we find Medline sentences for which the DISEASE is the direct object).
I think I have too little data to claim that there is indeed a difference between the two collections, and it would be interesting to substantiate this claim looking at more data.

Appendix A

List of lexical patterns meant to identify purpose. Sentences containing these patterns can be seen at: [http://www.sims.berkeley.edu/~rosario/patterns/patterns_rel_14](http://www.sims.berkeley.edu/~rosario/patterns/patterns_rel_14)

Appendix B

All the 53 sentences with treatment and affliction in FrameNet, Health domain. For my analysis, I used only the sentences with treatment for disease in the medical sense. (The starts * delimit the roles –in capital letters).

FrameNet sentences in the Health Domain with TREATMENT and AFFLICTION

The difficulty here is that *SIMPLE LACK OF STRESS* may also alleviate *THE SYMPTOMS* — so an improvement while on holiday may be a slightly ambiguous result.
Besides, it is not always easy to distinguish "TREATMENTS THAT" alleviate "SYMPTOMS" and enhance life from those that prolong it; this point is well illustrated by the use of angiotensin-converting enzyme inhibitors for cardiac failure.

In Quattro Pro for Windows, Borland has alleviated "THE PROBLEM" "WITH ITS ` NOTEBOOK SPREADSHEET " CONCEPT".

From the mid-1970s successive governments attempted to alleviate "THE CRISIS" "BY CURBING PUBLIC EXPENDITURE".

Agrarian reform programmes have two basic aims, one of which is redistributive, to provide a juster pattern of landholding and alleviate "POVERTY" "BY GIVING THE PEASANTS MORE SUBSTANTIAL PLOTS OF LAND".

People who feel unloved and depressed often alleviate "THOSE STRESSFUL FEELINGS" "BY GOING OUT AND BUYING THINGS".

Much high technology medicine is therefore palliative, alleviating "THE EFFECTS OF THE DISEASE" "BY RELIEVING PAIN OR RESTORING MOBILITY".

The one Minister with the political courage and economic sense to attempt to alleviate "THIS SITUATION" "BY USING THE PRICE MECHANISM SELECTIVELY" was Hugh Gaitskell.

"GROWING AFFLUENCE" has not alleviated "ANXIETY ABOUT THE FUTURE" and we are a better insured nation now than we were in 1979.

Morley’s `sin " was to acknowledge the short-term attraction of crack and to seek to explain, from his own experience, how "THE DRUG" might alleviate "SOCIAL ALIENATION".

However, "SUCH TREATMENT" does nothing to alleviate "THE CAUSES OF SUCH A BAD HABIT", and no doubt increases the horse’s anxiety to even higher levels.

But some tablets were kindly provided and "THEY" did alleviate "THE PROBLEM".

"THE ORDINATION OF WOMEN" would certainly alleviate "SHORTAGES OF STAFF".

"THE EFFECTS OF UNEMPLOYMENT" can not be alleviated wholly "BY UNEMPLOYMENT BENEFIT".

"THIS UNPLEASANT EXPERIENCE" was alleviated "BY THE COMPANY OF HIS WIFE", who also brought with her so many domestic items that he says it was almost as comfortable as being at home!

"MY FRUSTRATIONS", "he said tautly, "would be alleviated "BY A LITTLE CO-OPERATION FROM YOU".

"HIS DISTRESS" could have been alleviated "WITH TREATMENT" far earlier if he had been diverted into the hospital system straight from the police station, or direct from the court, rather than via prison.

"THESE DISTURBANCES" are of course influenced by the level of nutrition, being exacerbated by a low protein intake and alleviated "BY A HIGH PROTEIN DIET".

What about the ones it reopens, he reflected bitterly, the old memories that, long dormant, it gratuitously stirs up until nostalgia becomes "A PAIN THAT" "NO BALM" can alleviate?
“AN OPERATION” is often the only cure “FOR THIS PAINFUL CONDITION”.

“IT” was built in the early nineteenth century to provide cures “FOR NUMEROUS ILLNESSES”.

The cure “TO ALL THESE DIFFICULTIES” was obvious -- “AMPLIFICATION”.

“THE WATERS FROM HERE” were reputed to be a certain cure “FOR ‘THE ITCH’”, as well as curing dogs of the mange.

I’m sorry, Mr Spratt, that I know of no cure “FOR EITHER HER DISORDER OR YOURS”, except, perhaps, “TOLERANCE”.

The others are dozing while I chatter, attempting to cure “THEIR SOMNAMBULISM” “WITH MY WORDS”.

`The man I went to cured “MY HIP” just “BY STROKING IT”,” Sean said.

For this reason, “IT” was called the Golden Bough and was believed to cure “DISEASES” in humans and cattle.

“HER SERVICES” were also called upon to charm away warts and cure “RINGWORM” in cattle.

`There’s a man down by the docks who claims he can cure “ILLNESS” “WITHOUT MEDICINE”.

SURGEONS are to start testing “A TECHNIQUE WHICH” could cure “SHORT-SIGHTEDNESS” in just 15 minutes.

It is especially important in these cases to apply “THE MEDICATION” effectively in order to cure “THE CONDITION”.

There is always “SOME MAGIC REMEDY” that will cure “IT”, or some whizz-kid quack with a patent method.

`I don’t see how “THAT”’s going to cure “MY NIGHTMARES””.

I don’t want to suggest that “SOCIAL PROBLEMS” can be cured “BY THE APPLICATION OF WEALTH”.

It was almost as if she was suffering from “SOME DREADFUL DISEASE” that could only be cured “BY HIS PHYSICAL REMOVAL”.

“BY A VISIT TO A DOCTOR, A PSYCHIATRIST, OR EVEN THROUGH A PROGRAMME OF COUNSELLING AND GUIDANCE”, “MENTAL ILLNESSES” can be cured, and almost always are.

The modern monarch is not a figure, which is to be unquestioningly revered, and who “WITH A MAGICAL TOUCH” can cure “SCROFULA” (Bloch, 1973).

It occurred mainly in communities with poor diets and was eventually identified as “A DEFICIENCY DISEASE WHICH” could be promptly and completely cured “BY SUPPLYING ADEQUATE FOOD”.

“THE TREATMENT” can be used indoors and outside, curing and preventing “BOTH WET AND DRY ROT”, and wood-worm attacks.
`*NOTHING THAT* *YOUR ABSENCE* would n't cure .

There must be *SOME REALITY THAT* can heal *THE FRAGMENTATION OF THE WORLD* .”

However, although *THESE DRUGS* heal *70-80 PER CENT OF ULCERS* within four weeks of treatment they do not cure the underlying disease .

*A MAGNANIMOUS GESTURE FROM THE FOUNDERS OF THE OPEN SOFTWARE FOUNDATION* is needed now to heal *ANY LINGERING BREACHES IN THE INDUSTRY* .

It also made him want even more to pull her close and heal *HER WOUNDS* *WITH A KISS* .

They argue that Mrs Aquino can heal *OLD WOUNDS* *BY ALLOWING THE FORMER DICTATOR TO COME HOME* , at the same time disarming his supporters who scream that he is being done an injustice .

Our study shows that *BFGF* , even at a dose that did not affect gastric acid secretion ( 30 µg ) , was also effective in healing *THESE LESIONS* .

In 1852 *THE BREACH* was healed *BY THE ELECTION OF PROFESSOR WILLIAM SEWELL AS PRESIDENT RCVS* .

*MOST ACUTE ULCERS* had been healed *BY H 2 RECEPTOR ANTAGONISTS* , and only one patient ( randomised to placebo ) had received bismuth subcitrate before entering the trial .

We used to treat *OUR CORAL CUTS* *WITH IODINE* , unaware that the coral polyps which had entered the wounds normally thrived on iodine which they extracted from seawater -- and were now extracting from our blood .

The injection is not a conventional vaccine as *IT* treats *THE INFECTION* rather than being used as a preventive measure .

Mr Sommerville said *NINHAM ’S CONDITION* could be treated *BY DRUGS* .

Folkman discovered that *TUMOURS IN RABBITS ’ EARS* treated *WITH PROTAMINE* grew much slower than untreated tumours .

ALTERNATIVE medicine practitioners were accused by the Royal College of Physicians yesterday of making false and misleading claims for their treatments *OF ALLERGIES* *BY UNORTHODOX METHODS* .