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THE CANADIAN JOURNAL.

NEW SERIES.

No. LXII.—APRIL, 1866.

ON THE AMOY COLLOQUIAL DIALECT.

BY W. HENRY CUMMING, M.D.

(Read before the Canadian Institute, 31st March, 1866.)

This dialect is spoken in the city of Amoy and the surrounding districts. Dr. Medhurst, in his Dictionary (printed at the Honorable East India Company's Press, Macao, 1832) calls it the Fuh Kien Dialect. But as the province of Fuh Kien, though one of the smallest, has at least five distinct dialects spoken within its borders, and as the dialect under present consideration is not that spoken in and around the provincial capital Fuh Chau Fu, it seems scarcely entitled to the name. It has been also called the Chang Chau dialect from the city of Chang Chau Fu, about twenty-five miles S.W. of Amoy. This city, containing about four hundred thousand inhabitants, is the capital of the district in which the dialect is spoken called by Dr. Medhurst, the Fuh Kien dialect. This dialect differs, in some of its tones, as well as in very many words, from that spoken in Amoy. As too, Amoy is not in the district of Chang Chau, but in that of Tsiuen Chau, and as the Tsiuen Chau peculiarities are for the most part found in the speech of the Amoy people, the name of this latter district might more appropriately be given to this dialect. I have preferred, however, to call it the Amoy dialect, as that is the place best known to Europeans, it being the port of both those districts.

Amoy or Hia Mun (the harbour or gate of Hia) is situated in latitude $24^{\circ} 40'$ N., and longitude $118^{\circ} 20'$ E., upon the south-western corner of the island of Amoy, at the mouth of the Dragon river. At the beginning of the 18th century it was the seat of a large foreign commerce. It contains about 180,000 inhabitants. The two districts in which this dialect is spoken, contain two or three millions. The Chinese population of the island of Tai Wan or Formosa, estimated at two and a half millions, speak, for the most part, this dialect. So that within the limits of China proper it is the language of four or five millions.

But this dialect is not limited by the bounds of the Chinese Empire. The emigration from China to the islands of the Archipelago and to the south-eastern peninsula of Asia is composed of men from the districts where this dialect is spoken. The Fuh Kien men have been for centuries known as the mariners of China. Their junks have visited Bangkok, Malacca, Sumatra, Java, Borneo, and many of the islands. These junks are almost all of them owned in Amoy. The inhabitants of this region know that within eight or ten days sail of Amoy, there lie large, fertile, unsettled regions, where starvation is unknown. Tens of thousands, finding themselves unable to obtain subsistence in the midst of a dense population, leave their country to seek their fortunes in less densely peopled and more fertile lands. They have carried with them their language, and thus the Amoy dialect is spoken by hundreds of thousands of Chinese emigrants in Bangkok, Batavia, Borneo, and Singapore.

Hence the estimate does not seem extravagant that this language is spoken by five millions of people in these several regions.

A Spoken, and not a Written Language.

In China there is but one written language and this is identical in all parts of the Empire. This written language is not spoken, nor can it ever become a spoken language. It can not even be read aloud so as to be intelligible to an audience of cultivated men. The written language addresses itself to the eye and not to the ear. On the other hand, the spoken languages being unwritten, address themselves to the ear alone. Their range or area, unlike that of the written language, is very narrow, embracing only a few hundred square miles, and being used by only a few millions of people. It is not known how many distinct dialects exist within the limits of the eighteen

provinces, but it is probable that there are more than one hundred. In the province of Fuh Kian there are at least five, each one unintelligible in all other districts.

There was a time when the European languages were deemed unfit for the use of learned men, and when all books were written in Latin, so that a man who could not read Latin was shut off from all the literature of the age. Whatever then might be a man's native language, it was necessary for him to learn to read Latin. This is the case in China at the present day. No books are to be found in one's mother tongue; the language of books must be acquired by long and patient study. But, unlike the Latin, the written language of China can neither be read aloud intelligibly, nor spoken. There are so few sounds in this monosyllabic language, that the name and sound of a character give no certain clue to its meaning. By the people of the different provinces the names of the characters are uttered so differently that they are unintelligible to each other. The literati of China have therefore no spoken language adapted to their use in conversation on elevated subjects. The Chinese scholar gives and receives instruction solely from the printed page. If conversation on topics of science or literature be attempted, the defects of the spoken language are supplemented by the introduction and interpolation of well known and trite citations from the books. Some "book-phrases" have thus become a part of the ordinary colloquial language of the common people and are perfectly understood by all. Other phrases, less frequently cited among the uneducated, are in constant use among the literary, and serve to make up for the meagre vocabulary of the colloquial dialect. Chinese pedants employ so many of these "book-phrases" in their ordinary conversation that they are not understood by men of considerable literary culture.

The Mandarin or Court Dialect, the only common language throughout China.

For many centuries Nankin was the capital of China, and its spoken language has maintained to the present day its position as the court dialect of the whole Empire. A Chinese, who can read the books with the Nankin pronunciation of the characters, and can speak the Nankin colloquial, may converse freely on any subject with men of like training from any part of the Empire. The Chinese officers, and indeed those seeking official positions, all speak this dialect, without

a knowledge of which it is impossible that they can converse with their superiors or inferiors. This dialect, thus constantly employed in conversation of an elevated character, has probably been improved to the extent of its capabilities, but even thus it is but ill-fitted for its work. Notwithstanding all the additions received from the written language, it is still too meagre in its vocabulary; and its want of inflections is fatal to accuracy of structure and clearness and precision in style.

The Amoy dialect has never received this special culture bestowed upon that of Nankin, and is therefore every way inferior in fulness and even in perspicuity. Fewer "book-phrases" have been introduced into common use, and it is therefore much less fitted for elevated conversation.

Phonetic Elements of the Amoy Dialect.

The consonant sounds of the Amoy dialect are, for the most part, readily represented by Roman letters with their English utterance. They are B, Ch (as in "Church"), Chh (or Ch aspirated), G (as in "Gog"), H, J, K, Kh (aspirated K), L, M, N, Ng, P, Ph (aspirated P), S (as in "sister"), T and Th (aspirated T). The vowel-sounds are A (as in "father"), E (like A in "fate"), I (like E in "mete"), O (as in "note"), Ô (like "awe" or au in "author"), U (like O in "prove"). The compound vowel-sounds are ai (much like I in "fine"), au (like ou in "house"), ia (like ya in "yard"), io (like yo in "yeoman"), iö (like yaw in "yaw") and iu (like "yew"). K, M, N, Ng, P and T, are either initials or finals; B, Ch, Chh, G, H, J, Kh, L, Ph, S and Th, are always initials.

The twenty-nine monosyllables under the initial B :

| | | | | | |
|------|------|------|-----|------|------|
| Ba | Bat | Bi | Bin | Boe | Bua |
| Bai | Bau | Bia | Bio | Bö | Buan |
| Bak | Be | Bian | Bit | Bök | Bun |
| Ban | Bek | Biat | Biu | Bóng | But |
| Bang | Beng | Biau | Bo | Bu | |

A, I, Ô, are often nasalized, thus giving three new elementary sounds; Iu is also nasalized.

Besides the aspirated vowels (indicated by an H prefixed), there are four consonants aspirated (Ch, K, P and T). These must be distinctly marked by an aspiration preceding the following vowels, thus:—A, Hja; Ta, Tha; Pa, Pha; Ka, Kha; Cha, Chha.

There are not more than seven hundred monosyllables in the Amoy dialect. An Orthoepist trained in Europe would recognize only *seven hundred words*.

It is evident that conversation cannot be maintained with so small a number of words. The truth is, that there are several thousand monosyllabic words in this dialect.

Under the initial "B," it has been stated that there are twenty-nine monosyllables, and yet there are at least 181 distinct, separate, intelligible monosyllabic words beginning with "B." Of these 76 are nouns, 43 verbs, 22 adjectives, and 40 others.

Under the initial "T," there are 43 monosyllables, and yet there are at least 448 words, viz. : 186 nouns, 175 verbs, 46 adjectives, 18 adverbs, and 10 others.

Under the initial "Th," (aspirated "T"), there are only 39 monosyllables recognizable by a European ear, yet there are 223 distinct, monosyllabic words, viz. : 66 nouns, 117 verbs, 18 adjectives, &c.

Under these three initials (B, T, Th,) then, there are only 111 monosyllables orthographically indicated, and yet there are 852 distinct monosyllabic words, *i.e.* about eight words to each monosyllable.* If this proportion be maintained through the whole number of initials, it will give more than 5000 distinct monosyllabic words in the language with only 700 monosyllables. There are probably more than 7000 words.

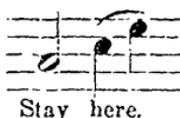
Let us proceed to show how these numerous monosyllables are uttered, so that they may be readily distinguished from each other.

"Stay here;" "Stay here?" are similar combinations of precisely the same letters. They may even be said to be *pronounced* alike, but when properly *uttered*, they are perceived to be very different. The one is a command, "Stay here;" the other is a remonstrance against the command. They are at once distinguished not by a difference of *pronunciation* (in the usual acceptation of that word), but by a differ-

ence of modulation. The command is modulated thus,



the other is



The word "Go" may be uttered with

* These numbers are taken from an unpublished vocabulary of the Amoy dialect. The number of words is probably much greater than here given. The number of syllables is exact.

these two modulations . In the former case it is an order, in the latter a question.  .
 Go. Go!

In the Amoy dialect the monosyllable "go" with the former tone means "to starve," with the latter modulation it means "goose." The former represents the seventh Amoy tone; the latter, the fifth. Take the monosyllable "Kau" (pronounced like our English word "Cow"); with the seventh tone, it means, "thick;" with the fifth tone, "monkey." But these are not all the tones and modulations that are used. The word "Kau" may

be uttered in a high monotone, thus ; this means "a ditch."
 Kau.

It may have the following modulation ; it then means "a dog."

It may be thus modulated  and then it means "enough."

If uttered with the same modulation, but in a quick, abrupt manner

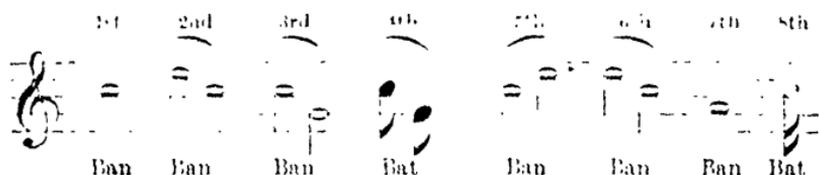
 it means "to decompose." These are severally styled the

first, second, third, and fourth tones; they are also called *upper* tones. The fifth and seventh tones have been already described. In the Amoy dialect the sixth tone is the same as the second. The eighth tone is a high monotone, very quickly and abruptly pronounced, thus

 The fourth and eighth tones are called by the Chinese, the
 Kau.

upper and lower "entering;" tones, Where the words end in "m," the "entering" tones have the "m" changed into "p;" thus "lam" becomes "lap." If the word end in "n," the "entering" tone changes "n" to "t;" thus "lan" becomes "lat." If the word ends in "ng," the "entering" tone changes "ng" into "k;" thus "lang" becomes "lak," "leng" becomes "lek," "löng" becomes "lök," "liöng" becomes "liök."

Let us now examine these several modulations in their relations to each other. We take the word "Ban."



The tones are indicated in various ways by different writers. The most readily recognized and most readily printed mode is the employment of the several accents—the acute, the grave, the circumflex, the long, and the staccato. By this method, the word “Ban” would be thus written in the several tones: **Ban**, **Bán**, **Bàn**, **Bat**; **Bân**, **Bán**, **Bâu**, **Bat**. In the cases of the first and fourth tones, no mark is used. Where the word ends in a vowel, the abrupt ending of the “entering” tones is indicated by affixing the letter “h;” thus the word “Ba,” written in the several tones would be: **Ba**, **Bá**, **Bà**, **Bah**; **Bâ**, **Bá**, **Bâ**, **Bah**.

The significations of a monosyllable in its several tones bear no relation whatever to each other. Thus the word “Ke” (pronounced like “Kay” in English) has the seven following meanings in its seven distinct tones:—

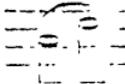
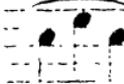
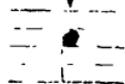
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|-------------------|--------------------|
| 1. Ke—a family. | 1. Si—silk. |
| 2. Ké—false. | 2. Sí—to die. |
| 3. Kè—a plan | 3. Si—four |
| 4. Keh—to divide. | 4. Sih—to twinkle. |
| 5. Kê—the caugue. | 5. Sî—a season. |
| 7. Kē—low | 7. Sî—to be. |
| 8. Kêh—to oppose. | 8. Sih—to lose. |

It thus appears that a monosyllable may, by these different tones, be transmuted into as many different and distinguishable words. In the written Chinese language there are eight tones, four upper and four lower. In the Nankin, or Court Dialect, there are, however, really only five different tones and modulations in use, the sixth tone being the same to the ear as the second, the seventh as the third, the eighth as the fourth. In the Canton and Fuh Chau dialects, there are eight different tones. These tones are not the same in the different dialects. Thus the Canton tones are different tones (musically considered) from those of the Amoy and Fuh Chau dialects. The Fuh Chau tones are several of them peculiar. The five tones of the Court dialect are all to be found in the Amoy, but attached to different numbers. The

first and second of the *Court dialect* are identical with the corresponding numbers in the Amoy. But the third tone of the Court dialect is identical with the fifth of the Amoy; the fourth of the former with the eighth of the latter; the fifth of the former with the third of the latter. Thus the third and fifth tones of these two dialects have interchanged modulations.

While there is such a resemblance between these two distant dialects (the Court and the Amoy), the neighbouring ones of Canton and Fuh Chau are very unlike to each other and to the intermediate Amoy.

A still more striking difference in intonation is to be found in the two conterminous districts of Chang Chau and Tsiuen Chau. The people of these two districts understand each other very well, the words being for the most part identical. Yet of the seven tones used, three are unlike in these adjoining districts. The first, second, third and seventh tones are identical in the two. But the Chang Chau fourth is identical with the Tsiuen Chau eighth, and the Chang Chau fifth and eighth are wholly unknown to the Tsiuen Chau. Their fifth

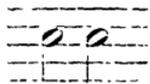
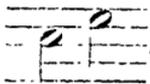
tone is not  but , and the eighth not 

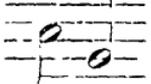
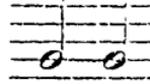
but . Of course the Tsiuen Chau fourth is not known to

them. A collection of all the various distinct modulations to be found in the eighteen provinces of China would doubtless be of great interest.

The difference in the modulation of the Fuh Chau, Amoy, Chang Chau and Canton tones is so great that a practised ear can determine which of these dialects is spoken on the deck of a vessel at such a distance that not a single articulation can be distinguished.

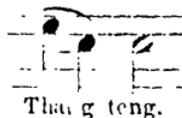
But there are also *composite* tones. Thus, a tone usually undergoes some modification when the word, of which it forms a constituent, is united with another word, to form a compound word of two syllables. Thus, "se" is "gauze" and "teng" is a lantern; but a gauze lantern is not pronounced

 but . So, again,

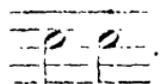
"teng chō," a "lantern stand," is not  but 

a first and a seventh tone thus being changed into two seventh tones. "Tháng teng," a "cask-shaped lantern," is not uttered with a second

and first tone, but with two first tones; not



but



Tháng teng.

These are given as instances of the change in the tones

resulting from the formation of compound words. To a foreigner, the whole subject is very difficult.

Practical efficiency of tonal distinctions.

This entire contrivance of tones as an element of spoken language may, at first sight, seem not only clumsy and difficult but uncertain and impracticable—necessarily leading to mistakes and most serious misapprehensions. But this is not the case, and whatever our opinion of the cleverness and ingenuity of the expedient, there can be no doubt of its success. The whole system of tones is most disheartening to the foreigner attempting to learn to speak Chinese, and for a long time the task seems an impossible one, the tones being difficult of recognition and still more difficult of accurate utterance. Yet the little children learn them with the utmost exactness, and utter them most distinctly, never failing to give the proper modulation. Thus trained, the Chinese see in a tone not the *accident* of a monosyllable but a *constituent part*. The common people and even the educated men seem never to have analysed their words and recognised the *articulate* and the *tonal* elements. If the tone be wrongly uttered, the error is deemed as great as if the mistake had been one of articulation. To say "béng" (second tone) instead of "bêng" (fifth tone) is regarded as an error not less than it would be to say "têng" for "bêng." Indeed the use of a wrong initial element would be thought a lighter fault than a false modulation.

From these facts it is evident that to a foreigner endeavouring to acquire a Chinese spoken language, a musical ear is of the highest value. No mental qualification is of equal importance. The language is not otherwise difficult; its structure is simple and its vocabulary limited. But the inability to recognize the pitch of sounds and the intervals of different tones, is as fatal to success in the acquisition of a Chinese spoken dialect as deafness itself. In acquiring most languages the articulation must be caught, and if that be effected, the work is

done. But in Chinese an element of fully equal value is the pitch of the tone with which the word is uttered or the nature and extent of the modulation. This want of ear (as it is called) has been a serious hindrance to many earnest men in their efforts to speak Chinese.

It must not be supposed that the absolute pitch of the tones is the same with all men, or even with the same man at different times. Different men speak on different keys; the same person speaks on different keys at various times and in various circumstances. So the tones are constantly varying in their absolute pitch with the variation of key, and yet bear to each other a fixed relation. So also the extent of the modulation varies with the emotions of the speaker. In tranquil utterance the range of modulation is usually a third, while in excited conversation it rises to a perfect fifth. Little children give a greater range to their modulations than adults.

Relation of the Amoy Tones to the ordinary tones of common utterance.

It will be observed that the Amoy Tones are such as we use in ordinary speech. Every one is employed in speaking English. But while in Chinese the tone is an essential and unvarying element of the word, in English it changes with the emotions of the speaker or the general drift of the sentence. Anger, fear, love, reverence, desire, pride, shame, and other feelings, determine our tones and modify them constantly. In speaking in an earnest, impassioned manner, the modulations are almost always appropriate and impressive. But in speaking Chinese, it is to be borne in mind that the very tones which seem to us so natural and expressive of our emotions, have been pre-engaged, and are already enlisted in the service of Orthodoxy. As rhetorical powers, they no longer exist, having been impressed for the work of mere verbal enunciation. A European, in speaking Chinese, must therefore be ever on his guard, lest the habits of his youth carry him away, before he is aware, and the modulations be employed in the expression of emotion, which must be jealously reserved for the distinction of words. In public speaking, great care is requisite, lest the feelings of the orator ruinously modify his utterance and render unintelligible or absurd his most weighty sentences.

But the question may be asked "Have the Chinese then no tones of emotion?" No one can listen to an earnest altercation, without perceiving that there is no lack of emotional modulation. But these tones are different from those used in the utterance of words. Any

one who has observed the great variety of intonations among the English, Scotch, and Irish, will be ready to admit the possibility of the Chinese finding enough for all their wants.

Distinction of Homophonous Words.

With 700 monosyllables varied by 7 tones, the Amoy dialect might comprise 4,900 distinct monosyllabic words. But these tones are not fully employed and consequently all these possible combinations do not exist. Some monosyllables have only one word instead of seven; others have two, three or four only. In consequence of this deficiency existing as to some syllables, others have far more than seven words in connexion with them—8, 10, 12, 15, 18, 20, 25, 27, and in one case, 30 words. In examining more minutely this last case (the monosyllable "To"), we find under the first tone, 4 words; under the second, 5; under the third, 5; under the fourth, 1; under the fifth, 11; under the seventh, 3; and under the eighth, 1. Under the fifth tone then there are 11 words precisely homophonous; uttered exactly alike; the nicest ear can recognize no difference among them. How can intelligible conversation be maintained amid such chances of misapprehension?

There is usually very little danger that a verb will be mistaken for a noun or adjective. If, however, there be several homophonous verbs or adjectives, there will be danger of confusion. In such cases perspicuity is obtained by the combination of two synonymous or nearly synonymous verbs or adjectives, if the context does not prevent misapprehension. In the case of like-sounding nouns, there is another expedient which is worthy of explanation.

The English phrase "He has twenty *head* of cattle," is perfectly intelligible. And yet it might be difficult to define the precise meaning, in that sentence, of the word "head." The sentences, "We saw ten head of ducks," "He caught ten head of fish," would be at once condemned as unidiomatic. A person familiar with Chinese grammar would describe the word "head" as the "numeral," "classative," or "classifier" of the word cattle, and declare it to be not the classifier of ducks or fish. If in English it were customary to say not only "head of cattle," but also "tails of fish," "sticks of masts," "sheets of sails," "bows of anchors," &c., the expedient, to which the Chinese have been driven by necessity, would be very fully illustrated. The nouns are seldom used without their appropriate classifiers. The numeral adjectives are not employed without the intervention of the

classifiers. Thus they do not say “*sì hī*” (four fish), but “*sì bé hī*” (four tails fish), not “*chit ù*” (one mast), but “*chit kī ù*” (one stick mast). By this expedient many phrases are rendered readily intelligible, which would otherwise be hopelessly confusing. These classifiers are not only interposed between the numeral and the noun, but they follow the numeral, where the noun is not expressed but understood. Thus to the question “*lí ā kúí chiah bé?*” (how many horses have you?) the answer is “*sì chiah*,” (four head), not “*sì*” alone. These classifiers sometimes marshal strange groups. The same word is the classifier of chairs, tables, bedsteads, sails, wheel-carriages, wheeled instruments, curtains, bows, letters, (epistles), &c. Many of the groups, however, are quite natural.

Relations of the Words in the Written and Spoken Languages to each other.

The characters of the written language have different names in various parts of China. As the Arabic numerals, while conveying the same meaning to men of different nations, are yet called by entirely different names, so a Chinese character has different designations in various regions. The Nankin man calls certain two characters “*shih fan*.” They mean “eat rice.” The Amoy man, looking at the same characters receives from them the same idea, “eat rice,” but he names the characters “*sìt hūan*.” The tones are different, and so are the articulate elements. The Nankin spoken language follows very closely the sounds of the characters. “*Shih fan*” is not only the sound of the two characters, but it is the colloquial phrase for “eat rice.” At Amoy, on the contrary, while the written expression is “*sìt hūan*,” the colloquial phrase is “*Chiah p̄ng*.”

From the following list it will be seen that many of the words are very unlike in the two languages.

| <i>English</i> | <i>Written.</i> | <i>Spoken.</i> | <i>English.</i> | <i>Written.</i> | <i>Spoken.</i> |
|----------------|-----------------|----------------|-----------------|-----------------|----------------|
| Man | Jin | Lâng | Flower | Hua | Hoe |
| Horse | Má | Bé | Nine | Kíu | Káu |
| Foot | Kiak | Kha | Milk | Jú | Lin |
| Ship | Chhuân | Chûn | Thief | Chek | Chbat |
| Know | Ti | Chai | Wise | Hian | Gáu |
| Sail | Hông | Pháng | Smoke | Ian | Hun |
| Fragrant | Hiang | Phang | Crockery | Chû | Húi |
| Speak | Suat | Kóng | Eight | Pat | Poch |

Notwithstanding, there are a great many words identical in sound and meaning, in the two languages.

There is also a large class of words in the spoken language clearly derived, by slight and methodical modification, from the written.

| <i>English.</i> | <i>Written.</i> | <i>Spoken.</i> | <i>English.</i> | <i>Written.</i> | <i>Spoken.</i> |
|-----------------|-----------------|----------------|-----------------|-----------------|----------------|
| Buy | Mái | Bóe | Wood | Bok | Bak |
| Sell | Māi | Bōe | Eye | Bok | Bak |
| Table | Tok | Toh | Ink | Bek | Bak |
| Descend | Lok | Loh | Green | Liok | Lek |

In English dictionaries the derivation of the word "tea" is traced, through the French and Spanish languages, to the Chinese "tsha." This is the pronunciation of the character in the Nankin or Court dialect, and has evidently nothing to do with our word "tea." The true derivation is from the Amoy word "tê," (pronounced *tay*), which is the word used both in the written and spoken languages. The earliest European trade was with this port, and thus the Amoy name was introduced into the Western European languages. The Russians, on the contrary, obtaining their tea by land from the Northern part of China, call it "tshai," a word evidently derived from the Nankin dialect.

Syntax of the Amoy Colloquial.

In Chinese (both written and spoken), there are no inflexions. Verbs, nouns, adjectives, have no prefixes and affixes, no augments and reduplications, no marks of case, number, person. There is a particle "tè" which gives to the immediately following verb a present sense; thus, "tè lâi" means "are coming," "tè khì" means "are going." There is a word which, preceding a verb, gives it a future meaning; thus, "guá beh lâi," "guá beh khì" means "I will come," "I will go." The particle "là," following a verb, indicates the preterite; thus, "lâi là," "come," "khì là," "gone." The word "liáu," following the verb, gives the idea of completeness to the past sense; thus, "chòe liáu," "thoroughly done," "chiàh liáu," "eaten all up." Another mode of expressing the preterite is by the use of the word "bat," "to know;" as, "guá m̄ bat khì," "I have never gone." The passive voice is sometimes expressed by the word "tit," "to get, to obtain." Thus, "bōe kóng," "cannot say," becomes "bōe kóng tit," "cannot be said."

Nouns do not change their forms, to express number or case. There is a genitive particle "ê" which follows nouns and pronouns. Thus "guá," "I," "guá ê," "my;" "i," "he," "i ê," "his;" "lân ê," "our," "lín ê," "your."

The pronoun "lí," "thou," has a true plural, "lín," the only instance probably in the language.

The adjective usually precedes the noun with which it is connected. When it follows the noun it becomes the predicate of a proposition, the substantive verb being omitted. Thus, "hó lîng" means "good man;" "lîng hó" means "man is good." "Gâu lîng," "wise man;" "lîng gâu," "man is wise."

The comparative degree is indicated by prefixing "khah;" thus, "hó," good; "khah hó" "better." The superlative is expressed by using particles meaning "very," "extremely."

There are, of course, adverbs, prepositions, conjunctions and interjections; these need no special notice.

On the Roman Orthography of the Amoy Colloquial.

The efforts of Sir William Jones to introduce a uniform mode of expressing, by means of Roman characters, the various sounds of Oriental languages, were much approved by European scholars. It seems to the literary world most desirable to have a single mode of writing ten, twenty, or even fifty different languages. But the fact is, either that the letters fail to designate the sounds with sufficient accuracy, or they become so burdened with diacritical marks, that the simplicity of the plan is lost. Besides, these diacritical marks are so tedious to the writer, so appalling to the printer, and so vexatious to the reader, that the utility of the entire plan is very questionable. To a resident of Amoy, it is important that the expression of the sounds of the Colloquial in the Roman character should be as phonetic and as simple as possible. And when it is considered that the great object in reducing it to a written form is, that it may be used by the masses of the people who know nothing of the Chinese written language, simplicity and phonetic efficiency are seen to be invaluable. It is hard that the letter "U" should be burdened with a diacritical mark likely to puzzle a Tsiuen Chau villager, merely because the unmarked letter has been already employed to express a different sound on the banks of the Indus. The interests of millions in China should not thus be sacrificed to the convenience of universal philologists.

But a special reason exists for being chary of diacritical marks for

expressing the sounds of letters. In all Chinese writing or printing in the Roman character, tonal marks are indispensable. If the tones are not clearly indicated, the failure is complete. The advocates of the adoption of Sir William Jones' system recommended the Chinese mode of indicating the tones, a plan used in several works printed at Canton and Macao. The first tone-mark is a semicircle placed at the lower left-hand corner of a word; the second, at the *upper* left-hand corner; the third, at the upper right-hand corner, and the fourth at the lower right-hand angle. The fifth, sixth, seventh and eighth, were indicated by the semicircle and a horizontal line, and corresponded in their positions with the first, second, third and fourth respectively. But this plan is burdensome to writer, printer, and reader. A far simpler plan and of ready employment is that of Medhurst, the father of the Fuh Kien Mission. The first tone is unmarked; the second has the acute accent; the third has the grave; the fifth, the circumflex; the seventh, the long [-] accent. The sixth tone is the same as the second, and needs no other mark; the fourth and eighth tones are distinguished from all the others by ending in h, p, k, or t; the eighth tone is distinguished from the fourth by a "staccato" mark.

The aspirated vowels are marked, not by a rough breathing, but by prefixing the letter "h." The consonant aspirates (ch, k, p and t) are indicated in the same way by the use of "h." The aspirated letters are written "chh, kh, ph, th."

The nasal sounds are indicated by a small "n" placed above the vowel.

The sound "awe" is expressed by a dot within the circle of the letter "O."

It is hoped that this short and very imperfect sketch of one of the spoken languages of China, will be of interest to some of the readers of the *Journal of the Canadian Institute*. The want of the proper type has greatly diminished the number of illustrations.

NOTES ON SOME PRACTICALLY INTERESTING QUESTIONS IN ECONOMICAL SCIENCE BEARING ON THE PROSPERITY OF COUNTRIES SITUATED AS OURS IS.

BY REV. WILLIAM HINCKS, F.L.S., ETC.,

(*Read before the Canadian Institute, 24th March, 1866.*)

I have had a good deal of doubt whether I ought to offer these notes to the Canadian Institute. I have nothing new to bring forward, and I pretend to no particular skill or knowledge on the subject. I have indeed studied it to some extent, and endeavoured, as I think all educated men engaged either in trade or professions ought, to understand its principles and their practical importance, but to repeat received and as I apprehend well-established principles in this place is what can only be excused under peculiar circumstances. My apology is, that I think I frequently observe symptoms of the prevalence, to some extent, in this country, of what I must account false, delusive and dangerous notions on great questions in economical science. This is probably not the case amongst thinking and reading men, but if we consider that the works on political economy are not in their nature popular, or in their price very accessible, as they offer no temptation for reprints, and that a very bad influence is constantly though imperceptibly flowing in from a neighbouring country where opinions and practices which set at defiance all the conclusions of science are almost universal it really is not wonderful that even intelligent and well-informed men amongst us should adopt notions in general circulation which have a certain degree of plausibility, though contrary to the conclusions which the highest authorities on the subject have deduced from the widest experience by the most cautious reasoning, which have come to be accounted as established truths, and have been practically applied with obvious advantage. As this is a case in which no one can doubt the importance of right views, and it is only by discussion and reflection on what can be said on both sides that they can be diffused, I must think it a useful labour to call attention to the subject, and that conviction must excuse an attempt which I can only hope to render tolerable by a direct reference in my observations to the sort of case presented by countries situated like our's in respect to the question discussed.

I rest with confidence on the fundamental principle that political economy is a *real science*, not consisting of the mere fancies and visionary theories of certain writers, but of knowledge concerning laws of nature which being unchangeable and universal in their operation, must be known that we may avoid the evils that must arise from their neglect, and that we may by acting in harmony with them make them promote our ends. If there were no natural laws in relation to wealth, its acquisition and distribution, there could be no science. If we misunderstand any existing laws, so far our principles are wrong and must be set right by further inquiry, but if, as we think, the knowledge of laws has been obtained, to go in opposition to them would be mere madness and folly. The first rude generalisations suggested by imperfect views of the facts can no longer be safely admitted as guides for practical measures. We must endeavour to follow the reasonings of those who have carried forward the science to its present advanced state, and unless we can prove them fallacious we ought to adopt the results as practical rules. My proposed part is to point out some instances in which popular prejudice is opposed to scientific reasoning, and to endeavour to make it plain that the latter is sound and good and ought to be our practical guide.

The first subject which it occurs to me to notice is the old—it might have been thought the exploded—fallacy of it being a great evil for money to go out of the country, or as the same thing is differently expressed, for the imports of a country to exceed its exports. This notion must depend either on the belief that money itself constitutes wealth, instead of being as it is now well known to be only one among the commodities valued, and being wanted only in a certain limited proportion; or on the fancy that importation injures home production, whereas it is manifest that there could be no importation excepting for the supply of wants, the means of payment for which supply must be procured by home industry; or from the assumption that it belongs to a certain clique to decide how the people shall employ their industry, and to demand from government means of preventing the public from seeking things abroad which they think should be prepared at home, whereas it is one of the most certain dictates of experience that individual self-interest is the safest and best guide, to what each man shall do, and it necessarily follows that the country flourishes most where every man produces what he can best produce and buys with his produce whatever he most desires

whether at home or abroad. If it could be conceived that a whole people unitedly purchased supplies for its wants abroad by means of wealth previously acquired without any care about production, that nation would rapidly exhaust any imaginable accumulation of wealth and be reduced to abject poverty. But the thing is not to be conceived. The wealth of a nation is that of the individuals composing it. The trade of a nation is that separately carried on by all its citizens, and cannot be considered as one thing. There may be too many instances of rogues and dupes, but the rule is nevertheless plain enough that those cannot supply their wants who cannot give an equivalent which can only arise from present industry or from the accumulations of that which is past. Now he who labours has an indefeasible right to employ the produce of his industry as he pleases, provided he does not injure others, and it is a fair presumption that he will supply his wants wherever he can supply them best and cheapest, whether within certain geographical bounds or not, or in what manner or form, bullion or otherwise, what he has acquired by his industry goes to pay for what he desires, are matters falling within the control of no free or just government, and the attempt to control which cannot possibly produce good, though it may often produce great evil.

All things imported are so because being desired, they may be had cheaper or better from abroad than they could at home, supposing they could be had there at all, and what is thus saved by a cheap supply of wants is spent in other employments of industry, being a clear profit to the country.

As to a favourable balance of trade enriching a country, some nations as England for a long period had always a favourable balance, and that to a great amount, yet this caused no extraordinary accumulation of the precious metals in that country. Other nations have had a long continuance of what are called unfavourable balances, yet have been all the time advancing in civilization and material wealth, so that no judgment can be formed respecting the real condition of nations from the comparison of their imports and exports. It is quite conceivable that a small island might be occupied by a community of merchants and traders, whose industry was almost entirely expended in fetching and carrying for other nations; importing all that they wanted themselves, exporting next to nothing of their own producing. Yet that community might flourish and grow rich.

Commerce is an appointment of the All-wise and infinitely benevolent Author of Nature, for equalizing, as nearly as may be, the advantages of different climates, soils, mineral productions, and other variable circumstances in the world's condition, by each region sending the superabundance useless to itself, of what it best produces, to other parts, and obtaining in return what is there best produced, thus at once conferring and receiving blessings and extending civilisation, knowledge and enjoyment. The very principle of commercial exchange is that what is cheap in one place bears a high value in another, so that interchange enriches both, whilst paying well for the industry employed in carrying, and offering in the most convenient manner. There are two great errors respecting commerce not yet sufficiently removed from the popular mind: one, that what is gained by exchange is lost by one party to be gained by the other, whilst really each makes the most of what he has to dispose of, be it goods or circulating medium, which is but a commodity conveniently representing a command over a certain amount of goods of various kinds, and advantage to one party by loss to the other only occurs where fraud is practised or where mis-information has caused ill-judged proceedings. The other great error is, believing a nation to be the better off the more completely it can supply every thing within itself, which is called being independent of other nations; and it is even supposed to be an advantage and a sort of merit to do without what cannot be produced at home, or to be content with an inferior article, home-made, in preference to a better, imported. The real independence of nations consists in their industry giving them command of all desirable things from all quarters. That industry should be employed in whatever way seems likely to yield the greatest surplus above our own requirements. It is egregious folly to try and produce at home what we can obtain cheaper or better by exchange from abroad; and the fancy that such a proceeding can increase our national wealth, is a mere blunder. In a very rude state of society, individuals are obliged to do almost all things for themselves, and, in consequence, do most of them badly and with great loss of time. Division of labour is a grand means for increasing the quantity and improving the quality of all desirable things. Territorial division of labour—a most just and expressive name for commerce—has the additional advantage that, from the different natural productions above and under the ground, of different regions, it supplies us with many things which we could not possibly

procure at home. Even different parts of the same country afford very different facilities for different kinds of industry, and it would be quite as reasonable for each of them, as for the whole, to resolve to do all things for itself. The principle, if good for anything, would really bring us back to the savage state. When a nation is led by peculiar advantages for that kind of work, to employ itself largely in manufacturing industry, it must of necessity, send a large part of its produce to other countries in exchange for food and for luxuries not to be procured within its own bounds; and also, for a common medium of exchange which the holders can use in purchasing from their neighbours such objects of desire as are to be obtained from them. In this case there is, of course, a favourable balance of trade. Suppose, on the other hand, that a nation is chiefly employed in drawing from a fertile soil, the various and abundant fruits of the earth, there will be also in the community many labourers, many artizans and manufacturers of such things as are advantageously made on the spot—many professional men rendering useful services, and many merchants and tradesmen introducing and distributing those articles which are best obtained from other countries. The farmer consumes his own required share of the produce of the soil, and of what he has over and above this he pays a part for labour and professional services, and a part for what he desires brought from other countries; if anything yet remains he puts it in the form most convenient for reserving it as capital. What goes into the hands of the professional man, is partly employed in purchasing services, and goods produced on the spot including a portion of the produce of the land, whilst a part goes to stimulate importations of foreign conveniences or luxuries; a portion also, in many cases being reserved as additional wealth or capital. What passes to the merchant or dealer is partly paid abroad for the commodities he introduces, the portion which forms profit being divided as already explained, between the purchase of produce of the land, of various services, of imported goods, and a portion added to capital, wherever prudence is joined with moderate success. Such a community is in a healthful and flourishing state, increasing from year to year in improvements, accumulations and enjoyments, and affording no pretence for any imputation of spending what it has no right to spend; yet, examine and you must perceive that its exports, consisting of the portion of its produce which is consumed neither by the producers nor by any of the classes employed by them, may be less in amount than the imports

which are to satisfy the wants not only of those who work the soil, but of all who render them services or render each other services—each of them obtaining a share of the whole produce of industry, and using a portion of that share in obtaining what the country does not yield. So long as nobody buys what he has not by his industry, present or past, the means of paying for, it is a matter of indifference in respect of public prosperity, whether the portion of the results of industry which is exchanged for foreign produce, all go out in the form of produce or a part in the form of a medium of exchange obtained by some of the dealers in the imported article to represent what has been consumed by those around them. In such a country there may be an unfavorable balance of trade without any thing really to be complained of, or unfavourable to the prosperity of the community. In some way or other the industry of the inhabitants purchases whatever is consumed by them; but in the case last mentioned, exchanges within the country put a certain share of what goes to pay for imports in the form of circulating medium, and this without the least real injury to the country. It may even be connected with the greater diffusion of the rewards of industry, and the higher rates of wages and profits which prevail in a country yet yielding more produce of the soil than its inhabitants need, and depending more on agriculture, mining, and lumber, than on manufactures.

It is useless to proceed further with argument. The danger of an unfavourable balance of trade is a mere delusion depending on a false analogy between a nation and an individual, and wrong views respecting the nature of commerce, and it ought not to meet with the least attention in an enlightened age and country. The doctrine is so much opposed both to the opinions of all recent writers of any importance on political economy, and to that general good sense which would leave to every man the unrestricted disposal of the fruits of his own industry, and which believes nations not to thrive at each other's expense, but to have all one common interest, and each to prosper more in proportion to the prosperity of all the others, that it seems to me something like an imputation to say that it meets with any favour amongst us. I feel obliged, therefore, whilst appealing to your own knowledge of sentiments which are widely extended, to make a short extract from an influential and popular source of information, the general utility of which I myself estimate very highly, in order to convince you that I am not combating shadows. The Montreal

Trade Review, which we must suppose to have some support amidst the mercantile community of that great city, having expressed itself in the following words: "During the last ten or twelve years the consumption of the Province has outridden the production by many million dollars; indeed we have been running into debt at the rate of some eight or nine million dollars a year, as will be seen by reference to the provincial import and export account. To conceive that such a course can be forever pursued without producing national insolvency, would be to condemn, as unsound, the principles established by all the great writers on political economy. A colony—and especially a new and not wealthy colony—cannot afford, any more than an individual, to spend a dollar and only earn seventy-five cents, without ultimately coming to grief." This passage, mistaken in its facts and in its reasoning and founded on ideas belonging altogether to the past, is quoted with the highest approbation in the *Journal of the Board of Arts and Manufactures for Upper Canada*, the use made of it appearing from the following words: "It (the *Trade Review*) does not, as is the case with most of our political newspapers, point to the large imports of wholesale merchants as evidence of the country's prosperity, but warns the people that if we continue to import so largely in excess of our exports, as we have been doing for many years past, it will inevitably lead to national insolvency; and instead of depreciating the efforts of those who desire to make this a manufacturing as well as an agricultural country, as is the wont of many of our public writers, shows that it is utterly impossible for us to be prosperous unless we manufacture much more largely than we now do, and thus employ our surplus and unproductive labour, and *keep capital in the country.*"

It is pleasant to learn from this writer that the public press generally is too enlightened to sanction such fallacious and dangerous notions, but the occurrence of such a passage in a work of such authority as I have quoted, emanating from a Board constituted by the government and which must be acknowledged to have accomplished very much good in proportion to its means, and in its *Journal* to diffuse a great amount of practically useful knowledge, is quite enough to show that the discussion of these subjects is needed amongst us. The passage quoted leads us to another important question, the attempt to make this a manufacturing as well as an agricultural country. We must in the first place distinctly understand what this attempt means. No country whatever is exclusively engaged in agriculture

There are many minor manufactories which are best carried on in the localities where their products are needed, and some more extensive ones will often arise from the skill and energy of individuals or the special facilities afforded for them. Cases may even occur in which a wise and far seeing people might offer some special encouragement in the way of bribe to a particular form of industry which seemed capable of being carried on with advantage, but was checked by preliminary difficulties. At the least where manufactures arise naturally, and can be carried on profitably, they are an advantage to any country, were it only by offering greater variety of industrial employment. Nevertheless what countries shall become great manufacturing countries or at what period they shall become so, depends on natural causes which cannot be forced, and any attempt to force them is at once unjust to the people at large who have to pay the price of the protection afforded, and unfavourable to the general prosperity. The usual conditions favourable to extensive manufactories are cheap fuel, cheap labour and cheap capital. For the fuel there may be a partial substitute in good water power—but cheap labour or low wages is a condition not belonging to a new country and very far from being in itself desirable—and cheap capital, which means abundance of money seeking profitable employment amidst a competition which obliges the owners to be content with a low rate of profit, can never be found where the newness of a country causes a want of many improvements for which capital is eagerly sought and highly paid for. No man of sense, considering how readily all the capital existing in this country or which can be drawn into it from abroad† is employed

† It is sometimes said that this capital instead of being employed in improvements which aid production, repaying themselves and increasing wealth, is borrowed to pay for luxuries which we have no right to enjoy, and is employed as part of our consumption, rendering the whole nation continually poorer. In whatever degree this is the case it is both a dangerous economical, and a bad moral symptom, and it is to be feared that instances could easily be produced, for all countries afford examples in which the possession of a certain, perhaps considerable amount of property, only creates habits of indulgence which require more than is possessed for their gratification, and the existing property yielding an annual produce may, of course, be made answerable for an immediate loan, until the interest swallows up the whole proceeds, and extravagance has ruined the owner. If the condition of our country offers any special inducements to such conduct, if cases of the kind are peculiarly frequent amongst us, and it is the fact that the capital we obtain on the pretence of being able to use it well is wasted in the manner supposed, then we are in a very bad state, and the evil

at a high rate of interest, can suppose that manufacturing capital can be obtained on such terms as the competition of the world's-trade would allow as profit. But the scheme perhaps is to manufacture for ourselves and to exclude competition. If this is not now contemplated it is what would soon be claimed were any steps taken to force manufactories. I surely need not employ many words on this subject. Where trade is free every man does what he can do best, and every one buys what he wants where he can get it best and cheapest—protection means a certain class of producers receiving for their goods an extra price above what need be paid, which is taken from the pockets of the consumers,—Why then should the public be taxed to support a class? Not to ensure their having the goods, for these would be freely offered at a lower price. But we pay an extra sum to induce some of our workmen to employ themselves in a way that we fancy rather than in the way that appeared to themselves profitable, at what possible benefit to the community it would be difficult to determine.‡ Manufactures which naturally arise and can be profi-

being a moral one this is hardly the place for discussing the remedy, but it is surely a hasty judgment which affirms that the large amount of introduced capital is really thus sacrificed ruinously to ourselves and dishonestly in respect to those from whom we borrow, and the great progress of the country of late years in substantial improvements, contributing to wealth, may be taken as proving that there has been a large profitable investment. It would doubtless be wise to spend less on luxuries and reserve more of what we obtain to increase our own capital, and it is well to make the rising generation sensible of the folly of that extravagance which arose from the temporary abundance of money from the expenditure on our great public works, urging them to a frugal and moderate course as really the happiest, and the sure road to prosperity individual and national, but it would be false to assume that our people are not in a condition to partake reasonably in the comforts of life, without dishonest extravagance, or to doubt that capital is largely and well invested in promoting the real advancement of the country.

‡ It is maintained that the history of certain manufactures which could never obtain a firm footing in Canada, whilst our duties were too low to check importation, but which have since greatly flourished as much to the advantage of the public at large as of the manufacturers, the articles being supplied at lower prices than under the former system, proves the advantage of protection in a new country, that we see the same in the successful manufactures of New England and Pennsylvania, and that England herself raised her manufactures by protection and resorted to free trade when she had such extensive possession of the world's markets that she could no longer be injured. To the first point I can only reply that it being quite evident from the nature of trade, that protection is a tax on each consumer for the benefit of the producers, and the producers of

tably conducted without protection are always advantageous, as supplying what is wanted on the spot in the form and style most suited to the locality, and as increasing the variety of human employments, and consequently the chance of every body being employed in the way that best suits him. Where there is every reason to believe a particular manufacture fitted for a country, but preliminary difficulties have prevented its introduction, it may be worth while to offer inducements to engage in it by bounties, but these are always temporary and at best the policy of such fostering of special employments is doubtful. The idea that the introduction of home manufactures would increase the total amount of employment of labour must be delusive, because the whole employment of labour depends on the amount of work to be done, and of capital that can be employed in doing it; but in a young country there is always a superabundance of work to be done, there will therefore always be as much employment as the moveable capital in the country can make profitable, and the general

any one article must always be few compared with the consumers, protection injures the majority for the advantage of the few, the rule against it thus obtained must be carried out honestly and fearlessly, without stopping to listen to the statements of particular manufacturers, and it is by no means necessary that we should be able to explain every possible case arising, in order to justify the general law. I have no doubt that one who had enjoyed opportunities for observing all the facts, could show in detail that the general law was as true and useful in relation to the specific cases alleged as proof to the contrary, as I plainly see it to be in other cases; but I rely on the certainty of the general law and decline to argue individual cases any further than whether they really fall under the law. We might just as well admit a great moral law and proceed to argue that in certain instances we were at liberty to set it aside for our own convenience. As to the prosperity of manufactures in some parts of the United States, no one doubts that protection will enrich a class, the question is whether it benefits the whole community, and if the inhabitants of the United States generally, and especially of those states which are themselves engaged in other kinds of industry, are content to pay, in the form of increased price, a tax for the benefit of New England or Pennsylvania manufacturers, we have no right or disposition to object to it, though we may have our own opinion of the wisdom thus displayed.

It is a very fashionable mode of reasoning to reprove England, because, beyond all other nations, through the action on her government of the best public opinion, when she has found out a mistake or fault committed, she has endeavoured to repair it. Circumstances favoured with her the use of manufacturing industry. Coal is abundant and available in an extensive district of her country, and the invention of the steam engine showed how it could be properly used as a source of manufacturing power. A crowded population, glad of employment at very moderate wages invited enterprise, and the wealth which had gradually accumu-

high price of labour is a proof that there is abundance of employment.* Neither can home manufactures keep capital in the country; for in a country like ours there is abundant profitable employment both for all the capital belonging to the inhabitants, and also for all that can be introduced from abroad, of which the amount is considerable; none,

lated in the country, seeking employment at even a moderate return, made the application of extensive capital to industrial undertakings easy, whilst a rapid succession of most important improvements in machinery gave an unheard of impulse to certain branches of industry—from these causes with the trade which her insular position and nautical tastes had gradually formed, England flourished notwithstanding the check arising from the mistaken principle of protection which was probably the less felt on account of the long wars in which she was engaged. Some of her ablest merchants and statesmen had caught glimpses of the truth on this subject, but Adam Smith in his great work incontestibly proved the evils of protection. For a time, as is usual in such cases, he was admired by thoughtful inquirers, but treated as a mere theorist by merchants and politicians. Improved education and improved intercourse overcame this difficulty, and at length strengthened by the opinions of the leading merchants, Mr. Huskisson made the first important step towards the relaxation of protection. The benefit attending every step made and the advancement of the public mind in knowledge of the subject, political economy having now become a recognised science, and engaged the attention both of men of eminent talent, and not a few of them of great practical experience in mercantile and monetary affairs, the progress became irresistible and resulted in the present general free-trade policy of Great Britain. It is easy to say that we became great first and made our change when it could not injure us. The plain fact is that the change was made from a conviction of the truth and consequent practical wisdom of a great principle, and is a lesson to the world at large. Similar reproaches have been made respecting slavery and respecting our Indian empire. England, like other nations, has been guilty of oppression and crime through mistaken policy and prevalent bad feeling at the time, but it is her special glory that she is first in growing wiser and learning better, and that with improved knowledge, her free institutions ensure altered conduct and efforts to repair the mischief done. Her course respecting protection is honourable alike to her intelligence and her principle, and has been rewarded by a success which ought to teach others, and if it has no other effect, at least leaves them without excuse for the follies they commit.

* It is said that the present state of our country affords little or no employment for women or children, and that the number of persons idling about our streets and living by begging or theft, proves the insufficiency of employment. It seems to me, I confess that the more our women can be spared from any other employment than domestic labours and duties, the better for us all. It would indeed be idle to expect that they can all be freed from any other form of labour, but if we allow for their share in rural occupations, for the number required for peculiarly feminine employments, and for those who engage in such trades as printing, watch-making, &c., which depend more on perseverance and ingenuity or tact than

therefore, goes out of the country from any cause which could be counteracted by the existence of another kind of enterprise. The increase of capital of individuals and of the country is the difference between the whole produce of industry and the portion expended in the supply of pressing wants, depending, therefore, on the union of frugality with successful industry. The portion of our produce which we consume is no part of capital. Our reasonable object is to make it give us as much comfort and enjoyment as possible, by buying all we want in the cheapest market, and whether this be found in or out of the country is perfectly unimportant, I fear that the existing tariff

on mere strength, and the number working in those of our existing manufactories which require their services, with the large demand always existing, and at present badly supplied for domestic assistance, we may perceive that every well brought up, respectably conducted female may, if necessary, creditably support herself, and the more there are who are supported by husbands and parents—not in idleness or silly pretensions to gentility, but in contributing to the happiness of those around them by active industry, the better it is for the community. We must by no means confound that want of employment which proceeds from neglected education, evil dispositions, and vicious habits, with that which arises from the state of the labour market in the country. The poorer classes in every country must begin a life of active labour earlier than is in itself desirable, but unquestionably it is the duty of parents to support their children until they are fit to support themselves. It seems reasonable and even necessary to enforce by compulsion, a certain amount of school education, which is with difficulty reconciled with very early employment, and where children are employed in numbers at an early age, we may observe that their wages are very low, and such as they are, going to the parents, are too often seen to encourage the latter in comparative idleness instead of really improving the condition of the family. No medical man will consider in any more favourable light than as an unavoidable evil, the laborious employment of women and children—especially in close factories; and I must think that an increased demand for such labour would be far from beneficial to our country. Nothing can be more opposed to fact than the notion that the moral condition of our people would be benefitted by such a change. As to the remaining class of unemployed men now living by beggary or theft, there is no doubt that our country is subject to remarkable fluctuations in the amount of employment which at times cause much distress, and which often oblige labourers and artizans to change their residence in order to obtain employment; but the class which lives in idleness and profligacy by improper means, is not to any extent formed by these fluctuations. Its existence indicates deficiency in moral training, early neglect, or bad example on the part of parents; want of compulsory education, which is the only chance of making the blessings of education general, and that predominance of low propensities and absence of moral restraint, which no abundance of well remunerated labour would prevent in bad and corrupt men, but which must be attacked by means not within the range of economical science.

of this country, which is probably too high for the best results to the revenue, has been approved by many, if not even recommended by its authors as being likely to afford indirect protection to home manufactures, which I observe to be a favourite idea with many persons. The nation needs a certain revenue. Customs duties are at present—whether most wisely or not—relied upon to a great extent for supplying it, and every regulation of the tariff is professedly designed for revenue purposes. Now it is very plain that if any such regulation excludes the imported article, and produces a home supply in its place, it has stopped one source of revenue. Whether it has done any good in another way, may be questioned, but undoubtedly it has injured the revenue. I deny that it can have effected any good, because the home manufacture which has arisen, lives by protection, and I hold protection to be always ultimately injurious to all parties and to be robbery committed on the consumers; but if we are to have protection we should have it openly and fairly—not introduced under the plea of revenue, for the sake of which a patriotic people are willing to sacrifice much. An import duty, which stops importation is imposed, not for revenue but for protection, and should only pass when deliberately approved on that ground, which will not be, I apprehend, when legislators understand the true interests and rights of their constituents.

Upon one other subject I desire to offer a few remarks. It must be supposed that adjoining nations, divided only by an artificial line, may, as a consequence of the different views of their governments, have their natural and useful intercourse not a little embarrassed, and be put to exceeding inconvenience in their mutual relations. In the case of this country and its powerful neighbour the United States, an attempt had been made to get over the difficulty by a special treaty termed the Reciprocity Treaty. The view upon which this was arranged was, that between friendly neighbouring States the convenience of both would be served by allowing the unrestricted interchange of various kinds of produce, chiefly articles for immediate consumption, such as might exist without interference with the tariff regulations of either country. Both countries using import duties as a means of revenue, and one also as a protection to home industry, the freedom of intercourse could not be carried to all lengths, but so far as it was arranged it seemed beneficial to both. Particular interests on either side may have thought themselves unfavourably affected; but the public at large seemed to derive benefit. Partly from the commercial

jealousy of our neighbours, accustomed on all sides to protection of special interests, still more we may suppose from the peculiar position in which they are placed in consequence of their recent internal struggle, the United States have seen fit to put an end to this treaty. Their government having involved itself in an immense debt and being forced to a very heavy taxation, not only feels compelled to tax for revenue all imports, without letting any escape, but in conformity with its established principle of action, deems it just to the industry of its own citizens to prevent, by high duties, less burdened neighbours from supplying their markets with advantage. The effect must be a great check on the intercourse between the countries, and possibly on our side a diminution of the profit of that which does take place, and it becomes an interesting problem to determine the course which we ought to pursue in our new circumstances. So far as any thing is in our power, without an entire change in our own approved policy and an abandonment of what we deem essential to our best interests, it would, without doubt, be wise in us to study the convenience and give our aid to the plans of our neighbour. Any course dictated by resentment at the loss of certain advantages, or by a desire to annoy or to take advantage of the difficulty of guarding a long frontier, would be altogether unworthy of the character to which we ought to aspire and would not fail to be ultimately injurious to us. Our policy in the case cannot be entirely regulated by economical laws, for there are cases in which such laws may point to one course, while the advantage of the nation on the whole might lead to a different one. The cultivation of friendly feelings with a neighbour is, in itself, not a small thing, and when a great nation has decided on its course, it is wiser to assist than attempt to counteract it. We should at least avoid provoking bad feeling and inviting injuries or enmity by any conduct of ours which is not forced upon us by the necessities of our own affairs.

It might possibly be plausibly argued that now would be the time for us to try the possibility of obtaining revenue by other means than customs duties, to reduce such duties to the lowest amount, or abolish them, and leave it to the ingenuity of our citizens to find means of profitable dealing in spite of prohibitions. Such a change in our present plans would, however, in the circumstances, be highly objectionable. Something is due to respect for moral principles and influences; something to the comity of nations; something to our manifest interest in keeping on the best terms we can with all our neighbours, and to carry

out their wishes so far as we are able. It may not be possible for us after recent changes, to carry on much commercial intercourse in a particular direction. To this we must reconcile ourselves and find out, as we certainly may, other places where the products of our country may have even a higher value, and the returns may be quite as advantageous to us. Trade, even with very distant countries, if they happen to be places where what we produce bears a high price, and some things that we want are plentiful and cheap, may be highly profitable, and the circumstances which force a people to look out for new channels for trade, though for the moment injurious, are often eminently beneficial in the result.

When any nation refuses to buy from another, on the protective principle, the spirit of retaliation suggests refusing, in return, to buy any thing from it; but wisdom whispers that we do not the less want what our neighbour can sell on terms which are, on the whole, favourable; and though he may be prevented, perhaps by illiberal views, from purchasing from us what we can offer advantageously, that is no reason for our depriving ourselves of what we can obtain best or cheapest from him. Our business is to raise some desirable things for producing which we have the greatest facilities in the greatest abundance we can, sell what we have raised in the best market we can find, and employ the proceeds in purchasing what we want wherever we can obtain it on the best terms. It is not always that the tailor can secure the shoemaker he wishes to deal with as his customer for clothes, yet he will buy the cheapest and best shoes within his reach, and would be very silly if in retaliation for the shoemaker not buying his clothes he took a dearer or inferior article from another. It would be the height of folly if to spite the shoemaker, he resolved to make such shoes as he could himself, thus wasting time which might have been profitably employed at his own proper business. It is often argued that if we allow a nation to sell to us that does not buy from us, we give up to that nation all the advantage of the trade both ways, and consent to be ourselves losers, whilst, it is said, if we guard by a sufficient duty against this supposed injury, it will become possible for our own people profitably to produce the article in question, and a new branch of industry is introduced amongst us. But it may be replied in the first place that the seller is not the only or of necessity the chief gainer by a transaction. He gains by what he offers, having cost

him less labour for its acquisition than would be required for him otherwise to produce what he receives in return, which is quite consistent with the buyer receiving more of what he wants than he could have acquired by using his industry directly in producing it himself, and therefore making a positive gain. The benefit is mutual, and if a neighbour does not choose, from any cause, to come to us as a buyer, but is willing to sell, if we find it profitable to ourselves, and not otherwise, we deal with him in that way. But further, it is replied that the new industry supposed to be introduced by refusing to buy from a neighbouring nation, is sustained only by the protection afforded by the duty we have imposed, that is by a tax for its support laid on the consumers, who are thus compelled to pay for the article more than they might have obtained it for; again, it should be observed that those who engage in the new occupation are to a great extent withdrawn from other pursuits in which they were previously engaged. Should it even appear that many of the workers at the new branch of industry were drawn into the country for the purpose, and added to its population, this, though in new countries with plenty of room for all, an undoubted benefit if the new comers are really self-sustaining, would be no benefit if their employment is only kept in activity by a tax on the community. Besides, whence comes the capital required for conducting the new undertaking? If from home capitalists, it was already all wanted for employments naturally arising in the country, and has been drawn aside from these by a prospect of heavy returns extorted by the protection and unjustly taken from the consumer; but if it comes from abroad, the temptation being a forced and unjust gain it can confer no real benefit on the country which receives it, for as the interest on foreign capital goes immediately out of the country, its advantage entirely depends on the additional profit its employment affords, and the assistance it gives by its use to industry; but in this case what is gained is by loss to the consumers, that is, to the people at large of the country in which the capital is invested. I conclude that however desirable reciprocity of advantages between neighbouring nations may be, the refusal on one side to buy from us does not prevent its being our interest and true wisdom to receive whatever is offered to us on favourable terms, and that we make the best of our condition when, although our neighbours judge it necessary to shut out what we have to offer for sale, we gladly purchase from them whatever we can get best from

them, never doubting but that our people can find enough to do profitably, and determined not to attempt controlling according to our fancies the natural course of trade, or to force amongst ourselves any kind of production, on any pretence, which cannot sustain itself against fair competition.

The part of the question which has now been discussed does not appear to me to involve any serious difficulty, though there are strong popular prejudices against the view I have taken, and many who think themselves favourable to freedom of trade justify exclusion against those who will not admit our produce, but it is when we come to consider the general adaptation of our own tariff to our present relations with our neighbours that some difficulty arises, not so much, I think from any obscurity hanging over the economical questions as from other circumstances, which must be taken into account. If I could see any course possible to be chosen by us which would assist our neighbours in carrying out the policy they have chosen, and, at the same time, lessen amongst ourselves the temptation to the demoralizing and pernicious practice of smuggling, I should earnestly recommend it, as on the whole to be preferred, even if scarcely defensible on grounds of economical science. I fail to perceive, however, how we could support the policy of our neighbours unless by adopting nearly similar duties on imported articles, a thing totally and obviously impossible, because those duties amount in many cases nearly to prohibition, and we, requiring revenue from our tariff to the greatest attainable extent, and having no desire to force unprofitable production by the protection such duties would afford; being also bound by our strongest and dearest interests to the British empire, and therefore incapable of intentionally preventing trade with it, have no choice but to arrange our duties so as without sensibly checking consumption, to yield the necessary income. We ought perhaps to lay a moderate duty on some articles recently received free from the States, certainly we cannot consistently with our obvious interests depart in other respects from the system we have adopted, though we may possibly make that system more perfect. If two adjoining nations entertain widely different ideas of what is right, just, and wise, the perseverance of each in its own plan will in time show which is really most advantageous, thus giving a lesson to the world. The United States has chosen the policy of protection which its opponents believe to be authorised

robbery of the many for the benefit of a few. Our's, I trust, will continue to be the policy of unrestricted freedom of trade. Let duties be imposed for revenue only on as many different articles as are worth their collection, but cautiously kept within such bounds as not to limit consumption, and they will reach their highest productiveness with least inconvenience or injury. From this course, neither any action of their neighbours, nor any desire of special protection of particular interests, arising among their own citizens, will turn an enlightened people, who will steadily discountenance every application for that protection of special interests which always means a desire to live at the public expense, and make personal or class advantages prevail over the general good.

ON THE VOCAL LANGUAGE OF LAURA BRIDGEMAN.

BY DANIEL WILSON, LL.D.

The study of the Science of Language in special reference to the discussions of Ethnologists and Anthropologists on the origin and progress of the human race, is giving novel importance to the rudest utterances of savage tribes; and even to the seemingly inarticulate sounds and "gesture language" of the deaf mute. The origin of Language itself, is anew discussed from very diverse points of view; and conflicting theories are sustained by evidence from many unexpected sources. Regarding language as a system of organic sounds subservient to intelligent volition, and employed as the symbols of ideas, the inquiry into the source of its primitive roots, is guided mainly in one or other of the two directions, either (1) of the miraculous endowment of man with the requisite radicals as constituent elements of language—"phonetic types," according to Professor Max Müller, "produced by a power inherent in nature: an instinct of the mind as irresistible as any other instinct;"—or (2) of the development of language by man himself as a being already endowed with reason. From among the many diverse sources of information relative to the operations of the human mind in associating specific sounds with ideas,

one may be selected for present consideration, which has already attracted a large amount of attention in various points of view, and is still calculated to furnish aid in prosecuting the inquiries here referred to.

A great and well-founded interest has been awakened by the successful efforts of Dr. Howe of Boston, to communicate language, and the power of interchanging thought with others, to Laura Bridgeman, a blind, deaf mute. The failure of the same skilful teacher in the case of Oliver Caswell, another mute similarly destitute of the senses of sight and hearing, adds to the interest of the former case, in which the peculiar intelligence of the object of this experiment, and the response of her own long dormant, yet vigorous reasoning powers, constituted the most important elements in effecting the success achieved.

Laura Bridgeman is not only deprived of sight and hearing, but she has no sense of smell, and is nearly destitute of taste; and thus, with one exception, her limited sense of touch is the sole means she possesses of communing with the outer world. She was in her seventh year when, in 1837, she entered the Boston Institution for the Blind. Dr. Howe, in his first observations regarding her, noticed that "there were marks of fineness in her organization; and that the nervous temperament predominated. This," he remarked, "gave sensibility, activity, and, of course, capacity;" and so encouraged him in the hope of that intelligent response on the part of his pupil, without which, all the efforts of the teacher must prove vain.

Describing Laura's arrival at her future home, and the first steps employed for the purpose of establishing some means of intelligent intercourse with her: Dr. Howe remarks, "She seemed quite bewildered at first, but soon grew contented, and began to explore her new dwelling. Her little hands were continually stretched out, and her tiny fingers in constant motion, like the feelers of an insect. She was left for several days to form acquaintance with the little blind girls, and to become familiar with her new home. Then the attempt was made systematically, to give her a knowledge of language, by which, and by which only, she could ever attain to any considerable development of intellect, or of affection." But the difficulty was, how to begin. Laura could not, like her blind companions, hear the spoken word, or name, of the objects within reach of her only available sense: that of touch; nor could she, like the deaf mute, see the visible pho-

netic or pictorial sign, or the written word. Yet until some recognized analogy between symbols, letters, or other arbitrary signs, and the things so expressed, could be established, all efforts at interchange of thought between herself and others, were limited to the few simple signs by which she had learned to communicate her sense of hunger and thirst, and her pleasure or distaste in reference to any action affecting herself. The very simple process adopted by her intelligent teacher has been thus recorded by himself. "The first experiments were made by pasting upon several common articles, such as keys, spoons, knives, and the like, little paper labels, on which the name of the article had been printed in raised letters. The child sat down with her teachers, and was easily led to feel these labels, and examine them curiously. So keen was the sense of touch in her tiny fingers, that she immediately perceived that the crooked lines in the word *key*, differed as much in form from the crooked lines in the word *spoon* as one article differed from the other. Next similar labels, on detached pieces of paper, were put into her hands, and she now observed that the raised lines on these labels resembled those pasted on the articles. She showed her perception of this resemblance by placing the label with the word *key* upon the key, and the label *spoon* upon the spoon." A familiar token of approval encouraged Laura to persevere in this exercise, until she had, in a similar way associated the printed names of many familiar objects with the things, so that when a number of printed labels were thrown together in a heap, she would select from them the proper one to represent any object produced.

Here, as will be seen, the teaching of words preceded that of letters. The next step was to cut up the labels into their component signs; and to teach her to arrange the *k, e, y*, together to form *key*, as the sign of that object; and the *k, n, i, f, e*, as the combined symbol of *knife*. The process was necessarily slow. The teacher had to enlist the sympathies of the child, in what was as yet the mere solution of a set of arbitrary puzzles. It was indispensable, therefore, to avoid fatiguing her, and so creating a distaste for the employment; and thus week after week elapsed, with no very encouraging progress. Though, perhaps, the same might be said in most first efforts at communicating the knowledge of letters and printed words to the ordinary pupils of an infant school. But this was the crucial stage of success or failure. Beyond this, in other cases it has been found impossible to advance; and only the responsive intelligence of the pupil could avert failure.

"Hitherto," says Dr. Howe, "there had been nothing very encouraging; not much more success than in teaching a very intelligent dog a variety of tricks. But we were approaching the moment when the thought would flash upon her that all these were efforts to establish a means of communication between her thoughts and ours. It was as though she were under water and we on the surface over her, unable to see her, but dropping a line and moving it about here and there, hoping it might touch her hand, so that she would grasp it instinctively. At last it did touch her hand, and she did grasp it; and we pulled her up to the light; or rather she pulled herself up. This exercise with the separate letters could not go on long without her perceiving that it presented a way by which she could make a sign of what was in her own mind, and show it to another mind. At last she did perceive it. She grasped the end of the cord that was thrown to her, and was drawn by it up and into human association. From this moment the way was plain and easy, and the success certain." Under the guidance of her skilful teacher she not only acquired the power of verbal thought, and the means of conversing with others, but has manifested unusual mental vigour and aptitude for intellectual development. When, however, she is spoken of as mute, it has to be borne in remembrance that there is no defect in her vocal organs. Like the majority of deaf-mutes, she does not speak, simply because she is alike destitute of all knowledge of the nature of audible sound, of the effect it can have upon others, and of its utterance by them. The mere deaf-mute sees the motions of the lips and other external indications of speech, of which she is unconscious; so that her mind is debarred from all conception of spoken language, except such as may be innate and instinctive.

Here then is a remarkable example of an active and highly intelligent mind, in a condition more completely excluded from acquiring phonetic signs of thought than any "wild man" shut out from all intercourse with his kind, and growing up from infancy as one of the natives of the forest. It may possibly throw some light on the general question of the source of language if we inquire how far, in her case, any traces of instinctive elements, or phonetic types, could be discerned. The first point to be noted in Laura Bridgeman is that, so far from being mute by nature, she was accustomed, before being subjected to training, to indulge freely in the use of her voice; but this being unregulated by the ear, and associated with no specific ideas to

the hearers, led only to harsh, and seemingly aimless sounds. Her teachers accordingly, while imparting to her a finger-utterance, arrested her in the effort to form a phonetic language, and taught her to restrain her desire for vocal expression. Yet even now the sense of enjoyment survives; and she will at times, when alone, indulge herself in giving free utterance to her voice.

But while the process of developing a vocal language was arrested in Laura Bridgeman by the very means which brought her into intelligent intercourse with her fellow-beings, there is one important exception. Abstract ideas are now represented solely by her acquired finger-language, or by writing; but the persons she comes in contact with receive from her an audible designation. She has a sound, generally a monosyllable, for every individual in whom she takes an interest. Dr. Lieber, who, some years since, devoted considerable time to the study of her vocal sounds, ascertained that she then used nearly sixty as signs of individuals.¹ It is thus apparent that while she lacks all means of vocal intercourse, by which alone organic utterances are matured into the recognized symbols of thought, she nevertheless has the innate idea of language, and makes sound supply the representatives of impersonations. The names moreover, are not arbitrarily given; but appear to have some association of specific ideas with certain sounds. Miss Wright, one of her teachers, remarks: "Before learning language, Laura used many signs to make known her wants, and for a long time gave to many of her friends names, which in some way were associated in her mind with the variety of their characters. She produces still the same sound for me that she made eight years ago, with this difference, that originally it was very soft and gentle; now it is louder and fuller, to correspond, as she says, with the change in myself." In another case she deliberately altered the associated sound. "One of her teachers," says Dr. Lieber, "told me that Laura once omitted to produce the accustomed sound indicating the person who related the incident, for a whole week; after which she uttered an entirely different name-sound, and said: this is your name;—which name, the teacher retained at the time the account was given to me." Here we perceive a deliberate selection and change of sounds to express certain associated ideas, and probably altered opinions.

Familiarity with the use of the finger-alphabet, and intercourse by

¹ *Smithsonian Contributions*, vol ii.

its means with others, has led Laura to drop many of the sound-names of individuals; and now she frequently converses at great length with herself, speaking, even in dreams, with one hand, and replying with the other. But the progressive developement of a spoken language can be seen in this, that the sound originally employed as the name of one of her teachers appears to be employed now as an equivalent to the words *teacher*, and *to teach*. Dr. Lieber draws attention to the fact that all the personal designations of Laura were monosyllables. In the brief personal intercourse, however, I had with her, during a visit to Boston in 1864, she repeatedly used the dissyllable *do-tah*, by which she now designates Dr. Howe. But her sounds, or names, are chiefly monosyllabic, or consist of a repetition of the same syllable. They differ, however, greatly from the accustomed sounds of the English language. The lips and throat are used much more than the tongue; and consonantal sounds,—as *b*, *d*, *f*, *fo*, *pa*, *pik*, *pr*, *ss*, *t*, *ta*, *ts*,—are most frequent. Among separate vowel sounds, *ee* and *oo* are most noticeable. But Laura has no ear to guide the modulations of her voice. They are not perceived by her as sounds, and have not, therefore, been matured into articulate speech; but are in many cases mere gurglings, chucklings, or moanings, as difficult to reduce to writing as the unfamiliar languages of the Clalam Indians or the Hottentots. Our words are formed with a special view to their effect on the ear, with the rolling *r*, the sibillant *s*, the broad *aw*, the prolonged *ll*, etc., and experience teaches their effect on others. But Laura's selection is probably guided by the very diverse perception of the only sense she is conscious of; so that sounds ineffective to the ear may be very expressive in the effects produced on her own organs of speech.

But apart from the training of the ear, both to regulate the modulations of the voice, and to instruct it by imitation, Laura's great want was the interchange of ideas, prior to receiving from others a ready-made language, which superseded the developement of vocal utterances as her representatives of abstract ideas. She gives sudden expression to the sound *Ff*, or *Fi*, when displeased at being touched by strangers; and in like manner she is observed to utter one or two other familiar involuntary interjections, or emotional expressions of pleasure or pain. But it is more important to notice that she uses the interjectional *fe*, not only as a sign of irritation and dislike, but also when playfully repelling advances; thereby indicating the change from an involuntary utterance, to its adoption as the sign of an idea.

In Laura Bridgeman then, we recognize a being possessed of lively intelligence, delicate mental perceptions, and acute moral and sympathetic feelings; capable of all organic utterances, but excluded by absolutely impassible barriers from any perception of spoken language. She cannot even conceive of sound as a thing heard; yet she aims at expressing ideas by its means, and derives pleasure from her own vocal utterances. If language be primarily a divine gift, or instinctive faculty, in which the organs of speech respond to conceptions of the mind, as other organs act in obedience to mental volition, her's seems to be a case where some of the assumed phonetic types or roots of language ought to be traceable. The interjectional element of language is clearly recognisable; while that of onomatopœia is precluded. Laura Bridgeman, as we see, possesses not only the rational soul, but mental faculties of a high order. But shut out from the external world, from whence knowledge is transmitted to us through eye and ear; and devoid of all means of communicating with other minds, her whole mental faculties lay inert, like one in a state of syncope. She uttered sounds, unquestionably associated in her mind with ideas; and craved in all ways to open up some avenue of intercourse with other minds. But all was darkness, silence, isolation, till she attained to an interchange of thought and experience with her fellow-beings. Nevertheless the mind was there; the means of manifesting its activities was alone wanting; and that supplied, the force of William Humboldt's remark forthwith appears:—"There could be no invention of language unless its type already existed in the human understanding. Man is man only by means of speech, but in order to invent speech, he must be already man."

The modern idea of man's origin by developement from an inferior unintelligent order of animated beings, presupposes an animal devoid of speech; and as intellect dawns, on its first stage of developement into the reflecting being, its originally limited powers of utterance gradually extend their compass, and language would thus be the slow product of effort, practice, and culture. On such a theory the detached elements of a vocabulary would be the first product; and the scientific relations of grammatical forms of language would pertain only to its latest stages, and in their most perfected condition to written languages. But, on the contrary, grammatical forms are now recognised as among the early and most enduring characteristics of a language; resisting changes which revolutionize its vocabulary. The infer-

ence is therefore justified, that an intelligent mind, capable of comprehending and using the forms and laws of structure involved in the relations of language to the innate perceptions of individuality, time, place, and all other discriminating niceties of what we call grammar, was an endowment of primeval man : fitting him for developing the associative relations of sound into a vocabulary expanding with his growing knowledge and intellectual requirements.

But, in addition to the attempts at the formation of a vocal language which have been noticed in the case of the remarkable blind and deaf-mute, Laura Bridgeman, some valuable indications of the instinct of language may be derived even from her mute signs. She exhibits all the impulsive manifestations of feeling : smiling, laughing, blushing, shuddering, and weeping. She gives the imperative stamp of the foot, the affirmative nod, the negative shake of the head, and other familiar signs of mental action, which she has not acquired, and cannot conceive of as perceptible to others. "When Laura is astonished or amazed," Dr. Lieber remarks, "she rounds and protrudes her lips, opens them, breathes strongly, spreads her arms, and turns her hands with extended fingers upwards, just as we do when wondering at something very uncommon. I have seen her biting her lips with an upward contraction of the facial muscles when roguishly listening, at the account of some ludicrous mishap, precisely as lively persons among us would do. * * * When Laura once spoke to me of her own crying, when a little child, she accompanied her words with a long face, drawing her fingers down her face, indicating the copious flow of tears ; and when, on New Year's Day of 1844, she wished in her mind a happy new year to her benefactor, Dr. Howe, then in Europe, she involuntarily turned towards the east, and made with both her outstretched arms a waving and blessing motion, as natural to her as it was to those who first accompanied a benediction with this symphenomenon of the idea, that God's love and protection might descend in the fullness of a stream upon the beloved fellow-being." In its touching pathos, this expressive benediction of the blind and deaf-mute surpasses that last farewell of "the blameless king," and Guinevere, when

"She felt the king's breath wander o'er her neck,
And, in the darkness, o'er her fallen head,
Perceived the waving of his hands that blest" *

The use by Laura of the affirmative nod, and the negative shake of the head, has already been referred to. Even when indicating the *yes* or *no* by means of her fingers, she involuntarily accompanies them with those signs. She also uses the negative shake of the hand by which, as it were, we repel an idea, and the abrupt movement of the head by which aversion is expressed. "The Italians," says Dr. Lieber, "move repeatedly the lifted digit from right to left, as a sign of negation, while the modern Greeks throw back the head, producing at the same time a chuckling noise with the tongue. Laura makes these signs even without writing Yes or No in the hand of the person with whom she converses: having learned, but not having been told, that some how or other we perceive this sign, or that it produces upon us the desired effect; although she is unable to solve the great riddle of the process by which this is done. Laura, far below our domestic animals, so far as the senses are concerned, but infinitely above them because she is endowed with a human mind, had attained to the abstractions of affirmation and negation at a very early age; while no dog or elephant, however sagacious, has been known to rise to these simple ideas, for which every moment even of animal existence calls, wherever reflection sways over the naked fact." Laura then,—while still with knowledge, not as in Milton's case, at one entrance, but at all entrances quite shut out, and without any possibility of conceiving of sound as audible or in any other way perceptible by others,—felt nevertheless an instinctive impulse to express her emotions and ideas, both by sign and sound. Speech was struggling in her for the responsive union on which the birth of language depends. Her interjectional utterances were wholly independent of imitation; onomatopoeic vocal-signs, if conceivable at all in her case, can only occur as suggestions of the one sense of touch by means of which she perceives the most delicate vibrations, and recognizes a friend or stranger by his step. No phonetic types of language can be discerned in her utterances; but the growing association of ideas with specific sounds, shows how thoroughly the rudiments of language as a means of expressing, though not of interchanging thought, appeared with the first response of recognition. Strange indeed, is it to think how that imprisoned soul in its lonely solitude, may have been giving audible expression to ideas, as full of meaning as the prattling of an intelligent child; and craving in vain the sympathetic return, to which it at length responded with such grateful ardour. Even now, when alone, she may be heard to utter the name-sound of

one of her friends ; and, on inquiry as to the reason of it, refers to some thought she was then indulging in about the absent one. While I was attempting to speak to her, she manifested a sense of irritation and perplexity, consequent on my blundering use of an unfamiliar finger-language. In the midst of this, Dr. Howe entered the room, and she immediately brightened up, and with a lively smile uttered the sound for her benefactor. To me it would have been meaningless but for the obvious association of ideas ; but to her friends it was the intelligible utterance of a name, accompanied with an expressive welcome.

Each subsequent stage of Laura Bridgeman's progress has been watched and recorded with intelligent interest. After mastering the use of the raised alphabet of the blind, she next acquired the manual alphabet of the deaf-mute ; and so could soon spell, on her fingers, the names of everything within her reach. Her next step was to master the names of their qualities ; as, *hard, soft, long, broad* ; though it proved a slow and difficult process to carry her mind beyond the special associated idea, as the hardness of the table, the softness of putty, &c., to that of hardness, softness, or the like qualities in the abstract. But, her age must be borne in remembrance, along with the far briefer period of her emergence into intellectual life. The appreciation of abstract ideas is not only of slow growth among children, but is found very partially developed among savages.

The next step was to acquire the expression of relation. Thus, a ring was placed on a box ; and, after she had been made fully aware of this, she was made to spell *ring on box*. It was then placed on a hat ; and, in response to the sign to renew her spelling, she repeated *ring on box*. But, on being checked, and the right word given, she speedily caught the idea ; and, following this and other objects through successive changes of place : in a bag, on a desk, in a drawer, &c., she thus not only learned to name the thing with which the object was thus locatively associated, but caught such nice distinctions as that between *on* and *in*. Active verbs, such as to *walk*, to *run*, to *eat*, to *drink*, to *sew*, &c., were easily acquired ; though the use of the auxilliary verbs, and the distinctions of mood and tense, were of slow attainment.

Next followed the teaching her to write. "It was amusing," says Dr. Howe, "to witness the mute amazement with which she submitted to the process, the docility with which she imitated every motion, and the perseverance with which she moved her pencil over and over

again in the same track, until she could form the letter. But, when at last, the idea dawned upon her that, by this mysterious process, she could make other people understand what she thought, her joy was boundless."

In relation to numbers, Laura Bridgeman is familiar with the process of addition and subtraction, and has a pretty accurate idea of the measurement of time. But, with her, a *hundred* is used as an indefinitely great number. She has the same accurate judgement of distances, and of relations of place, as is usually manifested by the blind. She walks with unhesitating confidence through the rooms and corridors of the large institution at South Boston, devoted to the use of the blind; and will rise from her seat, go straight toward the door, put out her hand at the right time, and grasp the handle, seemingly with as accurate precision as if she saw it.

Laura Bridgeman is now thirty-seven years of age. She continues to reside in Perkins Institution for the Blind, in South Boston, where she is surrounded by those familiar to her, and with whom she can hold ready intercourse. Her mind has expanded with her years, and revealed an intellect of great quickness, a keenly sensitive temperament, and a strong desire for knowledge. The religious training of her later years has accustomed her to the consideration of many profound speculations and inquiries; and her thirst for knowledge has been gratified in all ways within reach of her skillful and sympathising teachers. She has thus been placed in kindly companionship and intelligent intercourse with her fellow beings. But yet, with wisdom at so many entrances quite shut out; with four of the five gateways of knowledge for ever closed: the imprisoned soul escaping with difficulty through the solitary and straitened portal of its prison-house, presents, in every glimpse we obtain of its intercourse with the outer world, and every revelation of its own inner life, subjects of profoundly interesting and suggestive study. Among these, not the least interesting, on many accounts, are the vocal sounds in use as names of objects and symbols of ideas, by one to whom the very idea of sound is inconceivable; and in whose mind it seems hardly possible to imagine that any intelligible conception can have been formed of an auditory sense, or of the impressions produced on others by such vocal utterances as she, nevertheless, has been wont from childhood freely to indulge in, with a sense of enjoyment which still survives.

CANADIAN INSTITUTE.

Annual Report of the Council for the year 1864-1865, from 1st December, 1864, to 30th November, 1865, inclusive.

THE Council of the Canadian Institute have the honor to present the following report of the proceedings of the Society for the past year :

I. MEMBERSHIP.

The present state of the membership is as follows :

| | |
|---|-------|
| Members at commencement of Session, December, 1864..... | 400 |
| New members elected during the Session 1864, 1865 | 8 |
| Total,..... | 408 |
| Deduct—Deaths | 1 |
| Withdrawn | 11—12 |
| Left the Province..... | |
| Non-payment | |
| Total 30th November, 1865 | 396 |
| Composed of Honorary Members..... | 4 |
| Life Members | 31 |
| Corresponding Members..... | 6 |
| Junior Members..... | 3 |
| Ordinary Members, 352..... | 352 |
| Total | 396 |

II. COMMUNICATIONS.

The following list of Papers, read at the Ordinary Meetings held during the Session, will be found to contain valuable communications, including some of general interest.

10TH DECEMBER, 1864.

Rev. Prof. Hincks, F.L.S., &c., "On the King Vulture and other Birds of Tropical America."

Rev. H. Scadding, D.D., "On Errata Recepta, Written and Spoken."

21ST DECEMBER, 1864.

Hon. Vice-Chancellor Mowat—The President. "The Annual Address."

28TH JANUARY, 1865.

Rev. Prof. Hincks, F.L.S., &c.; "Remarks on the Principles of Classification in the Animal Kingdom.

Prof. E. J. Chapman, Ph. D., Read a Letter from Mr. Herrick, and made some remarks on some specimens of minerals from the North shore of Lake Superior exhibited by him.

4TH FEBRUARY, 1865.

Prof. D. Wilson, LL.D., "On Some Observations on the Vocal Utterance of Laura Bridgeman, the Blind and Deaf Mute, in their Bearing on Questions in Relation to the Origin of Language made during a recent visit to Boston."

11TH FEBRUARY, 1865.

M. Barrett, Esq., M.D., "On Bone, its History and Development."

18TH FEBRUARY, 1865.

Prof. D. Wilson, LL.D., "On certain Characteristic Types of Canadian Heads, Illustrated by the Conformateur."

Rev. H. Scadding, D.D., "On Anglicised German."

4TH MARCH, 1865.

Rev. Prof. Hincks, F.L.S., &c, "Thoughts on Belief and Evidence."

11TH MARCH, 1865.

Oronhyatekha (a Mohawk Indian), "On the Forms and Grammatical Structure of the Mohawk Language."

18TH MARCH, 1865.

M. Barrett, Esq., M.D., "On Bone, its History and Development."

1ST APRIL, 1865.

Prof. Wilson, LL.D., "On the Changes of Levels of Land, especially of that part of Scotland between the Forth and Clyde."

21ST APRIL, 1865.

Prof. D. Wilson, LL.D. "Exhibited a collection of Specimens of Flint, Bone and Horn implements and Cave Breccia found in the Dordogne Caves in Central France, by Mr. Chester, and transmitted by him to Dr. Thorburn, through whose kindness he was permitted to produce them."

Mr. McTavish of the Hon. Hudson Bay Company, "An account of the Esquimaux and his experience in the North of the Hudson Bay Territory."

III. REPORT OF EDITING COMMITTEE.

The Editing Committee, referring to last year's report, which suggested to the Council "a consideration of the propriety of closing the present series of the Journal and of placing the publication on a different footing, have to state that the Council having resolved to carry on the present series at least to the close of the tenth volume, and then to take into consideration the most desirable course for the future, the time has come when some decision must be arrived at, and the whole subject must engage the attention of the Council. Your committee have used their best endeavours to make the present volume worthy of its predecessors, and they hope that their object has been accomplished. The volume, of which the last number, from causes uncontrollable by the editor, has not yet appeared but is in a state of forwardness, will be found to contain fifteen original articles besides reviews and translations, making up the usual amount of matter, and they trust containing not less than usual of that which is of permanent value. Whatever course the Council may resolve upon, influenced by pecuniary

considerations or by the hope of exciting some fresh interest, your committee feel satisfied that the ten volumes now completed are a credit to the Canadian Institute, and an honourable monument of its labours in the promotion of Literature and Science.

The expenditure on the *Journal* for the year cannot be reported until the accounts for the number now in hand are made up, but there will be a further reduction in its amount as compared with last year, in consequence of a reduced number of copies.

All of which is respectfully submitted.

WILLIAM HINCKS, *General Editor.*

CURATOR'S REPORT.

The Curator of the Institute begs to report that the museum has been safely removed from the old premises to the large and commodious room set apart for it in the present building. This room has been specially fitted up for the purpose with glass cases, stands, and other conveniences requisite for displaying to advantage the several objects of interest. Through the kindness and labour of Dr. Scadding, the antique and other coins belonging to the institute have been named and placed in a separate case, in regular order. Accompanying the coins, and illustrative of them, is a catalogue specially prepared by Dr. Scadding, and extremely useful as a book of reference. The museum being placed on a new footing, with ample accommodation, it is to be hoped that the members of the institute will take a lively interest in its advancement, and contribute, or get others to contribute, such object or objects as will add to its attractiveness and value.

W. BARCLAY McMURRICH, *Curator.*

REPORT OF LIBRARIAN.

The librarian reports that the books of the institute have been safely transferred to the new rooms on Richmond Street, and placed on the shelves there provided for them; and that, as soon as an arrangement of them is made, which shall be found to be practically convenient, a new catalogue will be prepared.

REPORT OF MEDICAL SECTION, FROM NOVEMBER, 1864, TO NOVEMBER, 1865.

The meetings have been held every alternate Friday during the session.

Since the last report, papers have been read and communications made on many interesting subjects, regarding which discussions have also taken place.

The following is a list of the papers and communications:—

Polydipsia, by Dr. Thorburn.

Lithotomy, by Dr. Lizars.

Metal Magnesium, by Dr. Barrett.

Retained Placenta, by Dr. U. Ogden.

Physiological development of bone from Periosteum, by Dr. Barrett.

Zymotic disease and its treatment by the Sulphites, by Dr. O'Dea.

Prehistoric Remains, by Prof. Wilson.

Customs and habits of the Esquimaux, George Simpson McTavish.

Statement of the Canadian Institute General Account, for the year 1864-65 ;
from 1st December, 1864, to the 30th November, 1865.

Debtor.

| | | |
|---|---------|------------------|
| Cash balance, last year..... | | \$ 585 23 |
| “ interest received { on securities | 186 00 | |
| { from other sources | 2 22 | |
| “ received from members..... | 483 70 | |
| “ “ for Rent of House | 152 87 | |
| “ “ from John Dickson, Esq..... | 80 00 | |
| “ “ from A. Walker, Esq., building fund..... | 1 00 | |
| “ “ for waste paper | 6 20 | |
| Due by members, 1856 to 1865, inclusive | 1802 25 | |
| Due for sale of Journal { old, \$114 25 } | 163 50 | |
| { new, \$49 25 } | | |
| Cash, Parliamentary Grant..... | 750 00 | |
| | | <u>\$4213 96</u> |

Creditor.

| | |
|--|------------------|
| Cash paid on account of Journal { for 1864, \$473 48 } | \$ 857 40 |
| { for 1865, \$384 32 } | |
| “ “ Library and Museum | 134 84 |
| “ “ Sundries, Institute | 958 63 |
| Due on account of Journal, 1865 | 412 00 |
| Due on account of Sundries | 85 00 |
| Paid on account of Bank Commission | 2 12 |
| Estimated Balance..... | 1762 97 |
| | <u>\$4212 96</u> |

Statement of the Building Fund.

Debtor.

| | |
|---------------------------------------|------------------|
| Balance from last year | \$6314 05 |
| Cash, Interest on Securities..... | 186 00 |
| “ Donation, A. E. Walker, Barrie..... | 1 00 |
| “ Rent received for House | 148 63 |
| “ “ the Store-house..... | 40 00 |
| Subscriptions (not collected)..... | 2139 00 |
| | <u>\$8826 68</u> |

Creditor.

| | |
|--|------------------|
| Cash Commission to Mr. Wightman..... | \$ 9 37 |
| “ Taxes on Store-house | 11 25 |
| “ Ladder for House, and Cartage..... | 2 34 |
| “ Cleaning Water-closet | 6 00 |
| “ Snow-cleaning, 50cts. Lock, 80cts..... | 1 30 |
| “ Repairs | 3 50 |
| “ Insurance, 18th Sept., 1865, to 18th Sept, 1866, for \$1,800 | 36 00 |
| Balance..... | 8756 92 |
| | <u>\$8926 68</u> |

SAM. SPREULL, *Treasurer.*

THE ENTOMOLOGICAL SOCIETY OF CANADA.

REPORT FOR 1865.

The Council of the Entomological Society of Canada, in presenting their THIRD Annual Report, beg to congratulate the members on the continued success of the Society and its Branches. The list of members, though considerably varied by removals from the country and resignations, has still increased a little, there being now *fifty-two* names on the books, of whom *twenty-seven* belong to the Parent Society. The QUEBEC BRANCH now numbers *thirteen* members; "it has, however, to regret the loss of some valuable members, caused by the removal of the Government Offices to Ottawa,—members who felt great interest in the Society, and took an active part in carrying it on. Four papers were read during the year, three of which were published in the 'Canadian Naturalist and Geologist.' A number of valuable papers on Entomological subjects have been added to the Library during the year. The cabinet now contains a respectable number of specimens of all orders, including a good collection of named Diptera. The monthly meetings have been well attended, and several very pleasant excursions were made in the summer, resulting in the capture of many rare insects, some of them new to the insect Fauna of Lower Canada."

The LONDON BRANCH has now *twelve* members; regular monthly meetings have been held, at which valuable papers were read, and useful discussion carried on; during the summer season, also, very successful field meetings were held on the mornings of every Monday, when the weather permitted.

Two general meetings of the PARENT SOCIETY have been held during the year, and one or two field meetings; throughout the Autumn and Winter very pleasant and useful meetings have been also held once a month at the houses of members residing in or near Toronto. A second list of Canadian Lepidoptera, including upwards of 350 species, has been published, and distributed among the members. Supplies of German Entomological pins, and sheet cork have been imported for sale to members at cost prices. The Society's Cabinet has received some large and valuable additions of European insects of various orders, through the liberality of Francis Walker, Esq, F. L. S., of the British Museum, London, England; several rare specimens for Canada and the United States, have also been presented to it. On the whole, the Council cannot but consider the prospects of the Society very cheering, notwithstanding some disadvantages under which it at present labors, chiefly arising from the smallness of its funds. They regard too, with much satisfaction the progress which has been made in the scientific and practical study of Canadian insects; and are much gratified at the kindly recognition which has been paid the Society, both in the United States, in England, and on the Continent of Europe.

All of which is respectfully submitted,

CHARLES J. S. BETHUNE, *Secretary.*

The Council have also to report that in the month of September last, the Institute removed from the rooms in York Chambers to the premises owned by

it in Richmond street, which have been fitted up for library, museum, lecture room, and reading room. They trust that the change while only temporary may tend to promote the comfort of the members and increased attendance at its meetings.

APPENDIX.

DONATION OF BOOKS, &c., SINCE LAST ANNUAL REPORT.

FROM THE GEOGRAPHICAL SOCIETY, PER H. ROWSELL, Esq.

| | |
|--|----|
| Proceedings of—Vol. 8, No. 1, 31st December, 1863..... | 1* |
| 2, 25th February, 1864 | 1° |
| 3, 28th April " | 1* |
| 4, 29th June, " | 1° |
| 5, 23rd May, " | 1° |
| 6, 1st October, " | 1° |
| Journal for year 1862, Vol. 32..... | 1° |

FROM THE GEOLOGICAL SOCIETY, LONDON, PER H. ROWSELL, Esq.

| | |
|--|----|
| February 1st, 1864.—Vol. XX., Part 1; No. 77 | 1° |
| May 1st, " " " 2; No. 78 | 1° |

FROM THE GEOLOGICAL SOCIETY, LONDON.

| | |
|---|----|
| August 1st, 1864, Vol. xx. part 3, No. 79..... | 1° |
| Address, delivered at the Anniversary, 19th July, 1864, pre-faced by the announcement of award of Wollaston Medal, &c. By Prof. Ramsay, F.R.S. and President of the Society | 1° |

FROM SMITHSONIAN INSTITUTE, WASHINGTON, PER NATURAL HISTORY SOCIETY, MONTREAL.

| | |
|--|----|
| Meteorologische Waarnemingen in Nederland; On Zijne Bezittingen en Afwijkingen, &c., 1863..... | 1° |
| Mittheilungen der Kasserlich Koniglichen Geographischen Gesellschaft, VII., Jahrgang, 1863; VI., Jahrgang, 1862..... | 2° |
| Verhandlungen der Kiserlich Koniglichen Zoologisch Botanischen Gesellschaft in Wien XIV. Band..... | 1* |

FROM CHEWETT & Co.

| | |
|---|----|
| Canadian Almanack, bound, one Vol., years 1861–1865 | 1° |
|---|----|

FROM PROF. A. D. BACHE, SUPT. U. S. COAST SURVEY.

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|--|----|
| United States Coast Survey, 1862 | 1° |
| Do do do | 1° |

UNKNOWN.

| | |
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| The Law of Increase and the Structure of Man. By F. P. Leharzick, Vienna, 1862 | 1° |
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FROM DR. D. WILSON, TORONTO.

| | |
|-------------------------------|---|
| Smithsonian Report, 1862..... | 1 |
|-------------------------------|---|

FROM S. J. M. BROADHEAD, WASHINGTON.

| | |
|---|---|
| Report of the Commissioner of Patents, 1861—Arts and Manufactures, vols. 1 and 2 | 1 |
| Report of the Superintendent of the Coast Survey, 1862. Vol. 2, 1862-'63. 1 | 1 |
| Results of Meteorological Observations made under the directions of the U. S. Patent Office and the Smithsonian Institution, from 1854 to 1859, inclusive. Vol. 2, part 1. | 1 |

FROM THE OFFICE OF ROUTINE AND RECORD.

| | |
|--------------------------------|---|
| Statutes of Canada, 1865 | 1 |
|--------------------------------|---|

FROM THE AUTHOR.

| | |
|---|---|
| On Diseases of the Throat and Windpipe, &c. By George Duncan Gibb, M.D., M.A., London | 1 |
|---|---|

FROM THE AUTHOR.

| | |
|---|----|
| Preliminary Report of the Geology of New Brunswick, &c. By H. Y. Hind, M.A., F.R.G.S., 1865. | 1* |
|---|----|

FROM P. MCGREGOR, ESQ., TORONTO.

| | |
|--|---|
| Bailey's Astronomical Tables, &c. | 1 |
|--|---|

FROM THE SOCIETY.

| | |
|--|----|
| Proceedings of the Literary and Philosophical Society of Liverpool, during the 53rd Session, 1863-'64, No. XVIII | 1* |
|--|----|

FROM T. C. WALLBRIDGE, M.P.P.

| | |
|--|----|
| List of Post Offices in Canada, 1865 | 1* |
|--|----|

FROM GEOLOGICAL SURVEY OF INDIA.

| | |
|--|----|
| Palaeontology of Niti in the Northern Himayla, being descriptions and Figures of the Secondary Fossils, collected by Col. Richard Strachey, R.E., &c. | 2* |
|--|----|

FROM ALEX. MCEWEN, ESQ., TORONTO.

| | |
|---|---|
| Examen de Ingeniis or the Tryal of Wits, &c., published originally in Spanish by Doctor Juan Huartes, and made English from the most correct Edition by Mr. Bellamy; London, 1698. | 1 |
|---|---|

FROM H. ROWSELL, ESQ., TORONTO.

| | |
|----------------------------------|---|
| The Englefield Vases, 1819. | 1 |
|----------------------------------|---|

DONATIONS OF PAMPHLETS, SHEETS, &c.

| | |
|--|---|
| Union of the Colonies of British N. America, by P. S. Hamilton, Barrister at Law, &c., Nova Scotia. Received by post. | 1 |
| On the Temperature of Insects and its connection with the functions of Respiration and circulation in this class of Invertebrated animals. By G. Newport, Esq. By post. | 1 |

FROM G. A. GILBERT, ESQ., TORONTO.

| | |
|--|---|
| Two Photographs. (1.) Young Native (Female) of Australia 9 years old, married. (2.) Two married Females, Australian (Victoria) Nations.. | 2 |
|--|---|

FROM T. C. WALLBRIDGE, M.P.P.

| | |
|--|---|
| List of expiring Laws, (Legislative Assembly.) .. | 1 |
| The St Alban's Raid. Investigation..... | 1 |
| Annual Report of the Chamber of Commerce, St. John, N. B. | 1 |

FROM THE DEPARTMENT OF EDUCATION, U. C.

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| Remarks on the new separate school agitation, 1865..... | 1 |
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BY POST.

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| Annual Report of the Librarian of the Historical Society of Pennsylvania, 1864, Jan. 9, 1865 | 1 |
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BY COL. GRAHAM, U. S. CIVIL ENGINEER.

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| Proceedings of the American Philosophical Society, Jan.—June, 1859; Vol. VII, No. 61..... | 1 |
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FROM THE AUTHOR.

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| The Soils and Subsoils of Michigan. By Alex. Winchell, A.M., Professor of Geology, Michigan University..... | 1 |
| Notes on Selander Cerasi, Harris, as it occurs at Ann Harbor. By the same | 1 |

FROM CHRISTIANIA, PER SMITHSONIAN INSTITUTE.

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| Mindesonerker af middelalderens Kunst i Norge Udviqve Foreningen til Norske Fortid smindesmerkers Bevaring med Text af N. Nicolaysen, 1855 | 1 |
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| Do do do do | 1 |
| Norske Bygninger Fra Fortiden—Norwegian Buildings from Former Times. J. Tegninger og med Text Udgivne af Foreningen til Norske Fortids mindesmerkers Bevaring—Fjerde Hefte Pl. XIII.—XVI. og Pag 5-8. | 1 |
| Om de Geologiske Forhold Paa Kyststræckningen af Norde Bergenhus Amt, af M. Irgens og Th. Hiortdahl, 1864 | 2 |
| Om Sneebraeen Folgefon af S. A. Sexe, 1864 | 1 |
| Foreningen til Norske Fortidsmindesmerkers Bevaring aarsberetning for 1863 | 1 |
| Det Kongelige Norske Frederiks Universitets aarsberetning for Aaret, 1862.. | 1 |
| Beretning om Bodsfaengflets Verksombed i aaret, 1863 | 1 |
| Nyt Magazin for Naturvidenskaberne udgives af den physiographiske Forening i Christiania ved M. Sarsog Th. Kjerulf | 1 |
| Tolvte Binds fjerde Hefte, 1863..... | 1 |
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| Norges Fifterur af O. H. Loberg, 1864 | 1 |
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| Analytical and Critical Synopsis of a Selection of Piano-Forte Literature, &c., given before the Montreal Club, 25th May, 1865, by Dr. James Pich, Graduate in Music, New College, Oxford, &c. By post | 1 |
| Preliminary List of Plants of Buffalo and its Vicinity. By George W. Clinton, &c. By post | 1 |
| Calendar of McGill College and University, Montreal. Session of 1865-6... | 1 |
| Annuaire de l'Universite-Laval, 1865-66..... | 1 |
| Historical Sketch of the early movement in Illinois for the Legalization of Slavery, &c. By Hon. W. H. Brown, Chicago Historical Society | 1 |
| Faculty of Medicine, McGill University, Montreal, 1865-66. By post | 1 |
| The Report of the Observatory, Harvard College, 8th March, 1865 | 1 |
| Petroleum: its Geological Relations considered with especial reference to its occurrence in Gaspe, &c. By T. Sterry Hunt, L.L.D., F.R.S., &c..... | 1 |

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Journal of Proceedings—

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| Zoology, Vol. VIII. No. 30, Jan. 13, 1865 | 1 |
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The Proceedings of—

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| Vol. 1, Year 1836-7, Part 1, No. 1..... | 1 |
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| " 4, " 1848, " 1..... | 1 |
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| " 5, " 1850-53, bound in cloth | 1 |
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| Vol. 6, Year 1856, Part 4 | 1 |
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The Transactions of the Royal Irish Academy,

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| Vol. 24, 1862, Antiquities, Part 1..... | 1 |
| “ “ “ “ 2..... | 1 |
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| “ “ Science, “ 3..... | 1 |

FROM THE HISTORICAL SOCIETY, CHICAGO.

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| Fourth Annual Report Board of Works, City of Chicago..... | 1 |
| Seventh Annual Statement of the Trade and Commerce of Chicago, 31st March, 1865 | 1 |

FROM DR. ROSEBRUGH, TORONTO.

| | |
|---|---|
| Canada Medical Journal, Montreal; by G. E. Fenwick and F. W. Campbell, M.D. and L.R.C.P.S. | |
| Vol. 1, Year 1864, Nos. 1, 2, 3, 4, 7, 9, 11, & 12 | 8 |
| “ 2, “ 1865, “ 1 & 4 | 2 |
| The Buffalo Medical and Surgical Journal: by Julius F. Moirer, M.D. | |
| Vol. 3, Nos. 11 & 12, 1864..... | 5 |
| “ 4, “ 1 & 3, 1864: Nos. 6, 8, 9, 10, 11, & 12, 1865 | 8 |
| “ 5, “ 1 & 3, 1865..... | 2 |

FROM THE OFFICE OF ROUTINE AND RECORD.

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| Annual Report of Pierre Fortin, Esq., on the Fisheries in the Gulf of St. Lawrence, for 1864 | 1 |
| Report of the Board of Instructions of Asylums and Prisons, &c., for 1864. 1 | 1 |

BOOKS PURCHASED.

| | |
|--|---|
| Journal of the Board of Arts and Manufactures. Vol. 3, 1867, Vol. 4, 1864. <i>Binding only paid for</i> | 2 |
| Carlyle's History of Frederick the Great. Vols. 5 & 6..... | 2 |

IN EXCHANGE FOR JOURNAL.

| | |
|---|---|
| The Journal of Education Upper Canada [Dept.], 1865..... | 1 |
| The Journal of the Franklin Institute Philadelphia, 1865..... | 1 |
| The Artizan, London, 1865..... | 1 |
| The Journal of the Society of Arts, London, 1865. Duplicate..... | 1 |
| Silliman's American Journal, 1865..... | 1 |
| Canadian Naturalist and Geologist, 1865..... | 1 |
| Journal of Education, Lower Canada, 1864..... | 1 |
| Journal de l'Instruction Publique, Lower Canada, 1864..... | 1 |
| Journal of the Geological Society of Dublin..... | 1 |
| Transactions of the Royal Society of Edinburgh. Vol. XXIII, Pt. 3, session 1863-4..... | 1 |
| Proceedings of do., 1363-4..... | 1 |
| Proceedings of the Natural History Society of Philadelphia, 1865..... | 1 |
| Historical Collections of the Essex Institute, 1865..... | 1 |
| Proceedings of do..... | 1 |
| Annales des Mines, 1864-5..... | 1 |
| Proceedings of the Boston Natural History Society, 1865..... | 1 |
| Proceedings of the Leeds Philosophical Institute..... | 1 |
| Annals of the Lyceum of Natural History New York..... | 1 |
| Journal of the Board of Arts, Toronto, 1865..... | 1 |
| Transactions of the Royal Scottish Society of Arts..... | 1 |
| Anthropological Review, London..... | 1 |
| Journal of Royal Dublin Society..... | 1 |
| Proceedings of the American Society of Antiquaries..... | 1 |
| Transactions of the Literary and Historical Society, Quebec..... | 1 |
| Proceedings of the Antiquarian Society of Scotland..... | 1 |
| Memoirs of the Geological Survey of India..... | 1 |

DONATIONS FOR MUSEUM, 1865.

FROM G. A. GILBERT, TORONTO.

Iron Pyrites from Peru. Specimen..... 1

PER SANDFORD FLEMING, ESQ., C.E.

| | | |
|---|--|---------------|
| Iron Ore, } Iron Pig, } Iron Bar, } | From Acadian Iron Works, Nova Scotia. Specimens..... | } 1 1 1 |
|---|--|---------------|

Coal from Newcastle River, near the head of Grand Lake, New Brunswick.
Specimen..... 1

SAMUEL SPREULL, TORONTO.

Coins, small copper, French, 1855. Specimen..... 1

GENERAL METEOROLOGICAL

Provincial Magnetical Observ

LATITUDE, 43° 30' 4" North; LONGITUDE, 5h. 17m. 33s. West.—Elevation above

| | JAN. | FEB. | MAR. | APR. | MAY. | JUNE. | JUL. |
|--|---------|---------|---------|---------|---------|---------|---------|
| Mean temperature | 17.75 | 22.36 | 33.55 | 43.09 | 52.29 | 61.47 | 65.02 |
| Difference from average (25 years)... | -5.86 | -0.63 | +3.69 | +2.13 | +0.61 | +3.13 | -1.95 |
| Thermic anomaly (Lat 43° 40')..... | -15.05 | -12.34 | -6.55 | -7.11 | -5.81 | -0.13 | -3.68 |
| Highest temperature | 37.2 | 42.2 | 55.6 | 62.5 | 79.0 | 90.2 | 83.0 |
| Lowest temperature | -9.0 | -10.0 | -3.5 | 23.0 | 30.0 | 43.0 | 45.8 |
| Monthly and annual ranges | 46.2 | 52.2 | 59.1 | 39.5 | 49.0 | 47.2 | 37.2 |
| Mean maximum temperature | 24.60 | 28.64 | 39.29 | 50.67 | 61.24 | 74.19 | 74.14 |
| Mean minimum temperature | 10.09 | 15.52 | 25.11 | 34.93 | 43.65 | 56.73 | 55.63 |
| Mean daily range | 14.52 | 13.12 | 14.18 | 15.74 | 17.60 | 17.46 | 18.50 |
| Greatest daily range | 31.4 | 26.0 | 26.8 | 30.0 | 27.0 | 36.9 | 29.0 |
| Mean height of barometer..... | 29.5886 | 29.7024 | 29.5277 | 29.6169 | 29.5850 | 29.6327 | 29.5948 |
| Difference from average (18 years)... | -0.048 | +0.0902 | -0.0546 | +0.0299 | +0.0004 | +0.0703 | -0.0066 |
| Highest barometer | 30.191 | 30.232 | 30.058 | 30.156 | 30.003 | 29.877 | 29.876 |
| Lowest barometer | 29.114 | 29.082 | 28.707 | 28.980 | 29.179 | 29.232 | 29.247 |
| Monthly and annual ranges | 1.077 | 1.150 | 1.351 | 1.176 | 0.824 | 0.645 | 0.729 |
| Mean humidity of the air | 81 | 83 | 79 | 72 | 69 | 70 | 65 |
| Mean Elasticity of aqueous vapour..... | .086 | .105 | .159 | .203 | .278 | .432 | .402 |
| Mean of cloudiness | .70 | .71 | .78 | .64 | .53 | .62 | .53 |
| Difference from average (13 years)... | -.02 | .00 | +.17 | +.04 | .00 | +.10 | +.05 |
| Resultant direction of the wind | N 85 W | N 23 W | N 61 W | N 84 W | N 3 W | S 30 W | N 86 W |
| “ velocity of the wind..... | 4.80 | 3.95 | 2.16 | 2.11 | 1.65 | 0.60 | 2.28 |
| Mean velocity (miles per hour) | 9.39 | 8.23 | 8.80 | 8.39 | 5.48 | 4.06 | 5.34 |
| Difference from average (17 years)... | +1.37 | -0.11 | +0.13 | +0.33 | -1.11 | -1.21 | +0.37 |
| Total amount of rain | 0.440 | 0.810 | 3.050 | 3.972 | 4.005 | 2.005 | 2.470 |
| Difference from average (24 & 25 yrs) | -0.891 | -0.190 | +1.493 | +1.539 | +0.799 | -0.862 | -1.004 |
| Number of days rain | 1 | 5 | 10 | 17 | 11 | 7 | 11 |
| Total amount of snow..... | 14.8 | 16.8 | 18.9 | 2.0 | 0.0 | 0.0 | 0.0 |
| Difference from average (22 years) ... | -0.35 | -1.25 | +9.40 | -0.40 | -0.09 | ... | ... |
| Number of days snow..... | 18 | 11 | 12 | 6 | 0 | ... | ... |
| Number of fair days..... | 13 | 13 | 13 | 9 | 20 | 23 | 20 |
| Number of auroras observed..... | 3 | 4 | 2 | 4 | 5 | 5 | 7 |
| Possible to see aurora (No. of nights) | 13 | 13 | 11 | 14 | 20 | 18 | 24 |
| Number of Thunderstorms | 0 | 0 | 1 | 1 | 2 | 2 | 4 |

REGISTER FOR THE YEAR 1865.

atory, Toronto, Canada West.

Lake Ontario, 108 Feet; approximate Elevation above the Sea, 342 Feet.

| AUG. | SEP. | OCT. | NOV. | DEC. | Year 1865. | Year 1864. | Year 1863. | Year 1862. | Year 1861. | Year 1860. | Year 1859. |
|---------|---------|---------|---------|---------|------------|------------|------------|------------|------------|------------|------------|
| 65.18 | 61.49 | 44.54 | 38.58 | 27.71 | 44.92 | 44.70 | 44.57 | 44.35 | 44.22 | 44.32 | 44.19 |
| -1.03 | +6.65 | -1.11 | +1.83 | +1.51 | +1.75 | +0.53 | +0.40 | +0.18 | +0.05 | +0.15 | +0.02 |
| -3.32 | +2.99 | -9.26 | -4.62 | -8.29 | -6.08 | -6.30 | -6.43 | -6.65 | -6.78 | -6.68 | -6.81 |
| 87.8 | 90.5 | 71.4 | 63.2 | 54.2 | 90.5 | 94.0 | 88.0 | 95.5 | 87.8 | 88.0 | 88.0 |
| 44.4 | 42.0 | 21.6 | 23.6 | 5.7 | -10.0 | -15.0 | -19.8 | -5.2 | -20.8 | -8.5 | -26.5 |
| 43.4 | 48.5 | 49.8 | 39.6 | 48.5 | 100.5 | 109.0 | 107.8 | 100.7 | 108.6 | 96.5 | 114.5 |
| 74.95 | 74.07 | 52.29 | 44.85 | 34.73 | ... | ... | ... | ... | ... | ... | ... |
| 55.42 | 57.10 | 38.07 | 32.91 | 23.33 | ... | ... | ... | ... | ... | ... | ... |
| 19.54 | 16.97 | 14.22 | 11.94 | 11.41 | 15.43 | 14.57 | 14.73 | 14.43 | 14.42 | 14.24 | 13.60 |
| 30.8 | 24.9 | 24.8 | 24.2 | 30.6 | 36.9 | 37.4 | 39.6 | 37.0 | 33.3 | 30.7 | 39.8 |
| 29.6799 | 29.7180 | 29.6187 | 29.6548 | 29.6761 | 29.6330 | 29.5596 | 29.6536 | 29.6248 | 29.6008 | 29.5923 | 29.6209 |
| +0.0386 | +0.0531 | -0.0313 | +0.0409 | +0.0281 | -0.0197 | +0.0537 | +0.103 | +0.0115 | -0.0125 | -0.0210 | +0.0076 |
| 29.959 | 30.021 | 30.045 | 30.354 | 30.151 | 30.354 | 30.327 | 30.502 | 30.469 | 30.380 | 30.267 | 30.392 |
| 29.308 | 29.443 | 28.779 | 28.949 | 29.926 | 28.707 | 28.671 | 28.704 | 28.805 | 28.644 | 28.838 | 28.286 |
| 0.651 | 0.578 | 1.266 | 1.405 | 1.225 | 1.647 | 1.656 | 1.798 | 1.664 | 1.686 | 1.429 | 2.106 |
| 69 | 75 | 77 | 77 | 79 | 75 | 76 | 77 | 77 | 78 | 77 | 74 |
| .434 | .458 | .240 | .186 | .129 | .259 | .263 | .266 | .262 | .262 | .260 | .249 |
| .38 | .39 | .58 | .79 | .78 | .61 | 0.65 | 0.61 | 0.63 | 0.62 | 0.60 | 0.61 |
| -.09 | -.10 | -.05 | +.05 | -.02 | +.01 | +.05 | +.01 | +.03 | +.02 | .00 | +.01 |
| N 60 W | S 56 E | N 36 W | N 79 W | S 81 W | N 66 W | N 76 W | N 41 W | N 48 W | N 56 W | N 60 W | N 61 W |
| 1.55 | 0.47 | 0.58 | 2.98 | 3.07 | 1.98 | 2.49 | 1.34 | 2.03 | 2.11 | 3.32 | 2.24 |
| 5.07 | 4.12 | 7.26 | 7.90 | 7.33 | 6.78 | 7.40 | 7.13 | 7.33 | 7.47 | 8.55 | 8.17 |
| -0.11 | -1.42 | +1.12 | +0.43 | -0.99 | -0.10 | +0.54 | +0.27 | +0.47 | +0.61 | +1.69 | +1.31 |
| 1.990 | 2.450 | 2.705 | 0.975 | 1.727 | 26.599 | 29.486 | 26.483 | 25.529 | 26.995 | 23.434 | 33.274 |
| -1.036 | -1.280 | +0.175 | -2.173 | +0.036 | -3.344 | -0.469 | -3.472 | -4.426 | -2.960 | -6.521 | +3.319 |
| 8 | 12 | 17 | 5 | 7 | 111 | 132 | 130 | 118 | 136 | 130 | 127 |
| 0.0 | 0.0 | 4.5 | 1.1 | 5.2 | 63.3 | 74.6 | 62.9 | 85.4 | 74.8 | 45.6 | 64.9 |
| ... | ... | +3.72 | -2.02 | -9.49 | -0.06 | +11.24 | -0.46 | +22.04 | +11.44 | -17.76 | +1.54 |
| ... | ... | 3 | 7 | 11 | 68 | 70 | 74 | 72 | 76 | 75 | 87 |
| 23 | 18 | 14 | 21 | 14 | 201 | 180 | 181 | 189 | 165 | 174 | 169 |
| 8 | 7 | 9 | 1 | 0 | 55 | 34 | 44 | 48 | 43 | 58 | 53 |
| 22 | 23 | 19 | 11 | 13 | 201 | 168 | 182 | 176 | 180 | 190 | 199 |
| 4 | 2 | 1 | 0 | 0 | 17 | 20 | 24 | 24 | 27 | 30 | 30 |

In the following summary several of the results of the year 1865 are compared with the averages derived from a series of years, as well as with the extreme values of analogous results given by the same series :

TEMPERATURE.

| | 1865. | Average of 25 years. | Extremes. | |
|--|-----------|----------------------|-------------------------------------|---------------|
| Mean temperature of the year | 44.92 | 44.17 | 46.36 in '46. | 42.16 in '56. |
| Warmest month | August. | July. | July, 1854. | Aug. 1860. |
| Mean temperature of the warmest month..... | 65.18 | 66.98 | 72.47 | 64.46 |
| Coldest month..... | January. | February | Jan. 1857. | Feb. 1848. |
| Mean temperature of the coldest month | 17.75 | 22.99 | 12.75 | 20.60 |
| Difference between the temperatures of the } warmest and the coldest month | 47.43 | 43.99 | — | — |
| Mean of deviations of monthly means from } their respective averages of 25 years, signs } of deviation being disregarded | 2.51 | 2.33 | 3.58 in 1857. | 1.56 in '64. |
| Months of greatest deviation, without re- } gard to sign | Septem'or | January. | Jan. 1857. | — |
| Corresponding magnitude of deviation | 6.7 | 3.7 | 10.8 | — |
| Warmest day | Aug. 3. | — | July 12, '45. | July 31, '44. |
| Mean temperature of the warmest day | 76.67 | 77.45 | 82.32 | 72.75 |
| Coldest day | Jan. 17. | — | { Feb. 6, '55 } { Jan. 22, '57 } | Dec. 23, '42. |
| Mean temperature of the coldest day..... | 1.77 | -1.02 | -14.38 | 0.57 |
| Date of the highest temperature | Sept. 14. | — | Aug. 24, '64. | Aug. 19, '40. |
| Highest temperature | 90.5 | 90.6 | 99.2 | 82.4 |
| Date of the lowest temperature | Feb. 13. | — | Jan. 26, '60. | Jan. 2, '42. |
| Lowest temperature | -10.0 | -12.4 | -26.5 | 1.9 |
| Range of the year | 105.5 | 103.0 | 118.2 | 87.0 |

BAROMETER.

| | 1865. | Average of 18 years. | Extremes. | |
|--|--------------------------|----------------------|-------------------------|-----------------------|
| Mean pressure of the year | 29.6330 | 29.6133 | { 29.6679 in } 1819. | 29.5596 in } 1864. |
| Month of highest mean pressure | Septem'er | Septem'er | Jan. 1849. | June, 1864. |
| Highest mean monthly pressure | 29.7180 | 29.6629 | 29.5030 | 29.6545 |
| Month of lowest mean pressure | March. | June. | March, 1859. | Nov. 1819. |
| Lowest mean monthly pressure | 29.6277 | 29.5624 | 29.4125 | 29.5868 |
| | | Average of 25 years. | | |
| Date of highest pressure in the year | { Nov. 10. } 9 p.m. | — | { Jan. 8. } 1855. | October 22 } 1845. |
| Highest pressure | 30.354 | 30.364 | 30.552 | 30.242 |
| Date of lowest pressure in the year..... | { March 22, } 11 a.m. | — | { March 19, } 1859. | March 17, } 1845. |
| Lowest pressure | 28.707 | 28.681 | 28.286 | 28.939 |
| Range of the year | 1.647 | 1.683 | { 2.106 } in 1859. | 1.303 } in 1845. |

RELATIVE HUMIDITY.

| | 1865. | Average of 20 years. | Extremes. | |
|--------------------------------------|----------|----------------------|-------------|--------------|
| Mean humidity of the year..... | 75 | 78 | 82 in 1851. | 73 in 1868. |
| Month of greatest humidity | February | January. | Jan. 1857. | Dec. 1858. |
| Greatest mean monthly humidity | 83 | 83 | 89 | 81 |
| Month of least humidity..... | July. | May. | Feb. 1843. | April, 1849. |
| Least mean monthly humidity | 65 | 72 | 58 | 70 |

EXTENT OF SKY CLOUDED.

| | 1865. | Average of 13 years. | Extremes. | |
|--|----------|----------------------|-----------|------|
| Mean cloudiness of the year | 0.61 | 0.60 | 0.65 | 0.57 |
| Most cloudy month | November | December | | |
| Greatest monthly mean of cloudiness..... | 0.79 | 0.75 | 0.83 | 0.73 |
| Least cloudy month | August. | August. | | |
| Lowest monthly mean of cloudiness | 0.38 | 0.47 | 0.30 | 0.45 |

WIND.

| | 1865. | Result of 17 years. | Extremes. | |
|--|-------------|---------------------|---------------|---------------|
| Resultant direction | N 66° W | N 59° W | — | — |
| Mean resultant velocity in miles | 1.98 | 1.83 | — | — |
| Mean velocity, without regard to direction ... | 6.78 | 6.88 | 8.55 in 1860. | 5.10 in 1853. |
| Month of greatest mean velocity | January | March. | March, 1860 | Jan. 1848. |
| Greatest monthly mean velocity | 9.39 | 8.67 | 12.41 | 5.82 |
| Month of least mean velocity..... | June. | July. | Aug. 1852. | Sept. 1860. |
| Least monthly mean velocity..... | 4.06 | 4.97 | 3.30 | 5.79 |
| Day of greatest mean velocity | April 12. | | Mar'h 19, '59 | Dec. 2, 1848. |
| Greatest daily mean velocity..... | 19.40 | 23.14 | 31.16 | 15.30 |
| Day of least mean velocity | August 13 | | | — |
| Least daily mean velocity | Calm. | | | — |
| Hour of greatest absolute velocity | April 12 | | Dec. 29, '61. | Mar'h 14, '53 |
| Greatest velocity | 1 to 2 p.m. | 39.70 | 9 to 10 a. m. | 11 a.m. to n. |
| | 44.3 | | 46.0 | 25.6 |

RAIN.

| | 1865. | Average of 23 years. | Extremes. | |
|--|-------------|----------------------|-----------------|-----------------|
| Total depth of rain in inches..... | 26.599 | 20.955 | 43.555 in 1813. | 21.505 in 1866. |
| Number of days in which rain fell | 111 | 108 | 130 in 1861. | 80 in 1841. |
| Month in which the greatest depth of rain fell | May. | Novemb'r | Sept. 1843. | Sept. 1848. |
| Greatest depth of rain in one month | 4.005 | 3.765 | 9.760 | 3.115 |
| Month in which days of rain were most frequent | April & Oct | October. | Oct. 1864. | May, 1841. |
| Greatest number of rainy days in one month. | 17 | 13 | 22 | 11 |
| Day in which the greatest amount of rain fell | May 17. | — | Sept. 14, '43. | Sept. 14, '48. |
| Greatest amount of rain one day..... | 2.220 | 2.067 | 3.455 | 1.00 |

SNOW.

| | 1865. | Average. | Extremes. | |
|---|----------|-----------|--------------------------|----------------------------------|
| Total depth in the year in inches..... | 63.3 | 63.4 | { 99.0 in 1855. | 38.4 in 1851. |
| Number of days in which snow fell..... | 68 | 59 | { 87 in 1859. | 33 in 1848. |
| Month in which the greatest depth of snow fell | March. | February. | Feb. 1846. | Dec. 1851. |
| Greatest depth of snow in one month..... | 18.9 | 18.1 | 46.1 | 10.7 |
| Month in which the days of snow were most frequent | January. | December | { Dec. 1859 Jan. 1861 | Feb. 1848. |
| Greatest number of days of snow in one month | 18 | 13 | 23 | 8 |
| Day in which the greatest amount of snow fell | Jan. 10. | — | Feb. 5, '63 | { Feb. 26, 1854 Jan. 10, 1857 |
| Greatest fall of snow in one day | 7.0 | 8.5 | 16.0 | 5.5 |

MONTHLY METEOROLOGICAL REGISTER, AT THE PROVINCIAL MAGNETICAL OBSERVATORY, TORONTO, CANADA WEST.—JANUARY, 1866.
 Latitude—43 deg. 30.4 min. North. Longitude—5 h. 17.33 min. West. Elevation above Lake Ontario, 108 feet.

| Day | Barom. at temp. of 32°. | | | Temp. of the Air. | | | Excess of | | | Tens. of Vapour. | | | Humidity of Air. | | | Direction of Wind. | | | Result. Direction. | | | Velocity of Wind. | | | Kam in inches. | Snow in inches. | | | |
|-----|-------------------------|---------|---------|-------------------|--------|---------|-----------|--------------------|---------|------------------|---------|--------|------------------|-------|---------|--------------------|---------|--------|--------------------|---------|------------|-------------------|--------|---------|----------------|-----------------|--------|---------|-------|
| | 6 A.M. | 10 P.M. | Mean. | 6 A.M. | 2 P.M. | 10 P.M. | Mean. | Mean above Normal. | 6 A.M. | 10 P.M. | Mean. | 6 A.M. | 10 P.M. | Mean. | 6 A.M. | 2 P.M. | 10 P.M. | 6 A.M. | 10 P.M. | Result. | Direction. | 6 A.M. | 2 P.M. | 10 P.M. | | | 6 A.M. | 10 P.M. | Mean. |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 29.683 | 29.686 | 29.7692 | 34.9 | 33.1 | 24.1 | 30.02 | + 4.80 | 176.116 | 100.126 | 86 | 61 | 77 | 74 | W S W | W S W | W S W | 81 W | 81 W | 0 | ... | ... | 7.8 | 10.92 | 11.44 | ... | ... | | |
| 2 | 9.40 | 8.42 | 8.570 | 18.3 | 29.0 | 23.3 | 23.83 | - 1.77 | 106.117 | 99.5 | 99.8 | 81 | 76 | 75 | Cal. m. | S W | Cal. m. | S 71 W | S 71 W | 0 | 0.1 | 0.1 | 0.0 | 1.75 | 1.8 | ... | ... | | |
| 3 | 6.12 | 5.61 | 5.650 | 23.0 | 29.8 | 28.0 | 26.18 | + 2.0 | 106.117 | 139.123 | 86 | 71 | 90 | 84 | Cal. m. | S W | Cal. m. | S 71 W | S 71 W | 0 | 0.1 | 0.1 | 7.5 | 6.22 | 6.96 | ... | ... | | |
| 4 | 5.16 | 6.56 | 7.175 | 23.0 | 14.0 | 2.6 | 9.83 | - 15.30 | 106.056 | 93.3 | 93.1 | 86 | 68 | 87 | N W | N W | N W | N 44 W | N 44 W | 0 | 0.1 | 0.1 | 13.4 | 13.49 | 14.6 | ... | ... | | |
| 5 | 6.027 | 8.63 | 8.70 | 8.2 | 8.2 | 13.6 | 7.63 | - 17.50 | 93.035 | 67.9 | 65.3 | 94 | 82 | 82 | Cal. m. | N W | Cal. m. | N 74 W | N 74 W | 0 | 0.3 | 0.3 | 7.5 | 6.85 | 10.6 | ... | ... | | |
| 6 | 30.079 | 30.169 | 30.0835 | 5.7 | 3.5 | 4.6 | 4.23 | - 20.90 | 94.047 | 103.014 | 82 | 86 | 78 | 82 | N E | N E | N E | N 12 W | N 12 W | 0 | 0.3 | 0.3 | 8.0 | 7.75 | 7.49 | ... | ... | | |
| 7 | 30.470 | 30.651 | 30.6720 | 10.2 | 7.0 | 9.8 | 9.48 | - 34.62 | 92.021 | 92.3 | 95 | 81 | 79 | 63 | N E | N E | N E | N 18 W | N 18 W | 0 | 0.3 | 0.3 | 6.4 | 5.5 | 6.1 | ... | ... | | |
| 8 | 30.898 | 30.837 | 30.857 | 13.0 | 6.6 | 4.2 | 0.48 | - 25.67 | 92.4 | 92.3 | 96 | 51 | 100 | 77 | N E | N E | N E | N 18 W | N 18 W | 0 | 0.3 | 0.3 | 6.5 | 5.0 | 5.43 | ... | ... | | |
| 9 | 30.655 | 30.498 | 30.4925 | 0.6 | 16.5 | 7.8 | 8.02 | - 17.12 | 103.063 | 95.1 | 95.3 | 94 | 68 | 82 | N W | N W | N W | N 38 W | N 38 W | 0 | 0.3 | 0.3 | 1.6 | 0.0 | 0.34 | ... | ... | | |
| 10 | 30.144 | 29.911 | 29.9170 | 11.4 | 25.5 | 26.2 | 21.60 | - 3.44 | 102.125 | 131.108 | 85 | 91 | 92 | 89 | N W | N W | N W | S 42 W | S 42 W | 0 | 0.3 | 0.3 | 1.0 | 9.0 | 6.0 | ... | ... | | |
| 11 | 29.727 | 7.40 | 7.862 | 26.6 | 33.4 | 32.2 | 30.34 | + 5.87 | 126.163 | 175.159 | 87 | 85 | 96 | 91 | E W | S W | Cal. m. | S 29 E | S 29 E | 0 | 0.3 | 0.3 | 2.0 | 4.4 | 0.6 | ... | ... | | |
| 12 | 6.94 | 4.00 | 4.082 | 30.9 | 30.9 | 31.3 | 31.15 | + 6.07 | 164.168 | 174.170 | 94 | 97 | 99 | 97 | E | E | E | N 75 E | N 75 E | 0 | 0.3 | 0.3 | 14.0 | 10.6 | 11.34 | ... | ... | | |
| 13 | 1.72 | 3.64 | 4.137 | 33.8 | 28.4 | 12.5 | 23.82 | - 1.27 | 180.134 | 107.123 | 98 | 86 | 88 | 89 | N E | N W | N W | N 43 W | N 43 W | 0 | 0.3 | 0.3 | 5.5 | 16.8 | 13.0 | ... | ... | | |
| 14 | 9.27 | 30.116 | 30.116 | 3.3 | 0.3 | 0.3 | 0.3 | - 0.32 | 103.063 | 103.063 | 87 | 73 | 73 | 73 | N W | N W | N W | N 8 W | N 8 W | 0 | 0.3 | 0.3 | 10.0 | 10.0 | 6.9 | ... | ... | | |
| 15 | 30.176 | 29.914 | 29.914 | 7.815 | 2.4 | 14.7 | 20.813 | - 11.57 | 103.063 | 103.063 | 94 | 92 | 92 | 92 | E | E | E | S 7 E | S 7 E | 0 | 0.3 | 0.3 | 9.8 | 18.5 | 25.8 | ... | ... | | |
| 16 | 29.110 | 2.93 | 3.01 | 32.3 | 23.3 | 24.1 | 20.58 | + 1.58 | 158.080 | 100.114 | 81 | 71 | 77 | 77 | N W | N W | N W | S 53 W | S 53 W | 0 | 0.3 | 0.3 | 18.0 | 21.5 | 16.2 | ... | ... | | |
| 17 | 5.81 | 3.89 | 4.01 | 45.55 | 24.1 | 29.5 | 28.4 | - 23.72 | 170.100 | 121.119 | 109 | 77 | 74 | 74 | S W | S W | S W | S 57 W | S 57 W | 0 | 0.3 | 0.3 | 15.5 | 9.8 | 8.6 | ... | ... | | |
| 18 | 4.29 | 4.28 | 4.600 | 23.7 | 34.5 | 26.2 | 27.62 | + 2.6 | 112.144 | 115.123 | 87 | 72 | 85 | 82 | Cal. m. | W N | W N | N 20 E | N 20 E | 0 | 0.3 | 0.3 | 10.2 | 2.6 | 1.8 | ... | ... | | |
| 19 | 4.26 | 4.80 | 4.543 | 29.8 | 32.0 | 34.2 | 32.32 | + 7.43 | 154.158 | 185.169 | 93 | 87 | 93 | 82 | E B | E B | E B | N 75 E | N 75 E | 0 | 0.3 | 0.3 | 3.2 | 3.2 | 2.5 | ... | ... | | |
| 20 | 1.30 | 6.92 | 6.650 | 42.1 | 15.8 | 7.5 | 21.17 | - 8.65 | 259.060 | 0.14 | 114 | 86 | 66 | 72 | W S | W S | W S | S 72 W | S 72 W | 0 | 0.3 | 0.3 | 7.0 | 30.0 | 22.5 | ... | ... | | |
| 21 | 7.55 | 7.16 | 7.752 | 13.2 | 15.5 | 7.8 | 12.57 | - 12.26 | 97.001 | 95.1 | 96.0 | 90 | 68 | 82 | W S | W S | W S | S 70 W | S 70 W | 0 | 0.3 | 0.3 | 15.5 | 22.2 | 22.2 | ... | ... | | |
| 22 | 6.41 | 7.69 | 8.070 | 18.2 | 15.5 | 15.8 | 15.23 | - 9.43 | 106.065 | 106.065 | 84 | 57 | 74 | 73 | W S | W S | W S | S 66 W | S 66 W | 0 | 0.3 | 0.3 | 15.5 | 22.2 | 22.2 | ... | ... | | |
| 23 | 9.35 | 9.07 | 9.300 | 8.9 | 21.2 | 15.8 | 15.23 | - 9.43 | 106.065 | 106.065 | 84 | 57 | 74 | 73 | W S | W S | W S | S 66 W | S 66 W | 0 | 0.3 | 0.3 | 15.5 | 22.2 | 22.2 | ... | ... | | |
| 24 | 9.99 | 9.07 | 9.723 | 8.685 | 14.7 | 24.1 | 24.1 | - 120.65 | 3.9 | 107.114 | 104.066 | 85 | 82 | 87 | E B | E B | E B | N 70 E | N 70 E | 0 | 0.3 | 0.3 | 11.4 | 11.4 | 15.6 | ... | ... | | |
| 25 | 4.19 | 4.01 | 4.538 | 45.83 | 27.0 | 22.6 | 20.23 | - 1.32 | 136.097 | 99.6 | 111 | 93 | 80 | 88 | E | N W | N W | N 34 W | N 34 W | 0 | 0.3 | 0.3 | 17.6 | 10.6 | 4.67 | ... | ... | | |
| 26 | 5.88 | 5.91 | 7.15 | 62.93 | 17.6 | 21.9 | 19.019 | - 1.18 | 98.8 | 97.9 | 98.5 | 92 | 70 | 83 | Cal. m. | N E | N E | N 57 E | N 57 E | 0 | 0.3 | 0.3 | 5.0 | 3.2 | 1.5 | ... | ... | | |
| 27 | 7.78 | 8.11 | 7.817 | 7.918 | 18.6 | 21.9 | 21.6 | - 20.85 | 3.56 | 109.084 | 105.091 | 89 | 71 | 82 | N E | N E | N E | S 54 E | S 54 E | 0 | 0.3 | 0.3 | 3.6 | 0.0 | 2.1 | ... | ... | | |
| 28 | 6.93 | 6.29 | 6.650 | 22.3 | 24.1 | 107.100 | 100 | - 1.07 | 109.084 | 109.084 | 89 | 77 | 88 | 88 | S E | S E | S E | S 54 E | S 54 E | 0 | 0.3 | 0.3 | 6.0 | 7.3 | 4.78 | ... | ... | | |
| 29 | 6.51 | 6.59 | 6.621 | 6.485 | 23.0 | 27.0 | 30.2 | - 26.92 | 2.72 | 106.129 | 149.126 | 86 | 88 | 89 | N E | N E | N E | S 75 W | S 75 W | 0 | 0.3 | 0.3 | 8.0 | 8.6 | 7.70 | ... | ... | | |
| 30 | 4.08 | 2.46 | 4.70 | 8.775 | 32.7 | 36.0 | 27.31 | - 72 | 7.62 | 165.180 | 128.154 | 88 | 85 | 84 | S E | S E | S E | S 73 W | S 73 W | 0 | 0.3 | 0.3 | 9.2 | 8.0 | 8.6 | ... | ... | | |
| 31 | 3.88 | 2.55 | 2.562 | 19.7 | 30.6 | 23.3 | 24.90 | + 0.9 | 109.086 | 99.5 | 99.5 | 91 | 51 | 75 | W D | W D | W D | S 84 W | S 84 W | 0 | 0.3 | 0.3 | 21.5 | 3 | 2 | ... | ... | | |
| M | 29.724 | 29.708 | 29.724 | 19.8 | 23.20 | 19.82 | 20.73 | - 4.67 | 106.100 | 99.9 | 101 | 69 | 74 | 85 | ... | ... | ... | ... | ... | 0 | 0.3 | 0.3 | 7.73 | 11.52 | 8.02 | ... | ... | | |

REMARKS ON TORONTO METEOROLOGICAL REGISTER FOR JANUARY, 1866.

COMPARATIVE TABLE FOR JANUARY.

Notes—The monthly means do not include Sunday observations. The daily means, excepting those that relate to the wind, are derived from six observations daily, namely at 6 A.M., 8 A.M., 2 P.M., 4 P.M., 10 P.M., and midnight. The means and resultants for the wind are from hourly observations.

Highest Barometer 30.940 at 8 a.m. on 8th. } Monthly range = 1.830 inches.
 Lowest Barometer 29.110 at 6 a.m. on 16th. }
 Maximum Temperature -44° 0 on 20th. } Monthly range = 58° 0
 Minimum Temperature -14° 0 on 8th. }
 Mean Maximum Temperature 26° 22 } Mean daily range = 13° 62
 Mean Minimum Temperature 12° 70 }
 Greatest daily range 40° 8 from a.m. of 16th to a.m. of 10th.
 Least daily range 3° 8 from a.m. to p.m. of 1st.
 Warmest day 19th... Mean Temperature 32° 92 } Difference = 41° 80
 Coldest day 7th... Mean Temperature 9° 48 }
 Maximum Solar Radiation 90° 5 on 31st. } Monthly range = 110° 3
 Terrestrial -19° 8 on 8th. }
 Aurora observed on 3 nights, viz.—2nd, 8th and 20th.
 Possible to see Aurora on 11 nights; impossible on 20 nights.
 Snowing on 19 days; depth 10.3 inches; duration of fall 78.9 hours.
 Raining on 4 days; depth 0.522 inches; duration of fall 20.0 hours.
 Mean of cloudiness=0.76; most cloudy hour observed, 2 p.m.; mean=0.80; least cloudy hour observed, 10 p.m.; mean=0.67.

Sums of the components of the Atmospheric Current, expressed in Miles.

North. South. East. West.
 2069.61 1563.85 1527.81 3073.06

Resultant Direction, N. 75° W.; Resultant Velocity, 2.98 miles per hour.
 Mean Velocity, 9.24 miles per hour.
 Maximum Velocity, 32.0 miles, from noon to 1 p.m. on 20th.
 Most windy day, 20th—Mean velocity 24.37 miles per hour.
 Least windy day, 9th—Mean velocity 0.35 miles per hour.
 Most windy hour, 11 a.m.—Mean velocity 12.00 miles per hour.
 Least windy hour, 6 a.m.—Mean velocity 7.67 miles per hour.

The reading of the Barometer at 8 a.m. of the 8th, 30.540 is the highest entry yet recorded; the highest previously recorded being 30.552 on the 8th of January, 1855.
 The mean temperature of the 7th is the third lowest recorded, being exceeded by in both cases—14.38, January, 1866, may be classed as cold, dry, and windy.
 1st. Lunar halo. 4th. Lunar corona. 7th. Very cold day. 15th. Very stormy day. 21st. Solar halo and parhelia. 23rd. Solar halo. 20th. Very rapid change of temperature, falling about 27° in about 6 hours.

| YEAR. | TEMPERATURE. | | | | RAIN. | | SNOW. | | WIND. | | |
|------------------|--------------|-----------------------|-------------------|-------------------|--------|--------------|---------|--------------|---------|----------------------|-------------------------|
| | Mean. | Excess Above Average. | Maximum observed. | Minimum observed. | Range. | No. of days. | Inches. | No. of days. | Inches. | Resultant Direction. | Mean Force or Velocity. |
| 1840 | 17.0 | -6.6 | 40.6 | -13.8 | 54.4 | 4 | 1.33 | 11 | ... | ... | ... |
| 1841 | 25.6 | +2.0 | 41.7 | -4.1 | 45.8 | 2 | 2.16 | 14 | ... | ... | 0.36 lbs |
| 1842 | 27.9 | +4.3 | 45.8 | 1.3 | 44.5 | 5 | 2.17 | 9 | ... | ... | 0.78 " |
| 1843 | 28.7 | +5.1 | 51.4 | 1.5 | 52.9 | 6 | 4.23 | 12 | ... | ... | 0.69 " |
| 1844 | 20.2 | -3.4 | 41.6 | -7.7 | 52.3 | 11 | 3.06 | 11 | ... | ... | 0.70 " |
| 1845 | 20.2 | +2.9 | 43.0 | -3.4 | 46.4 | 5 | Imp | 9 | ... | ... | 0.70 " |
| 1846 | 26.5 | +3.1 | 41.2 | 0.3 | 40.8 | 5 | 2.33 | 10 | ... | ... | 0.55 " |
| 1847 | 23.3 | +0.3 | 42.6 | -2.2 | 44.8 | 7 | 2.13 | 5 | ... | ... | 1.09 " |
| 1848 | 28.7 | +5.1 | 51.5 | -12.0 | 63.5 | 7 | 2.21 | 8 | ... | N 82 W | 2.66, 5.82 ms |
| 1849 | 18.5 | -6.1 | 40.3 | -15.2 | 55.3 | 4 | 1.17 | 10 | ... | N 63 W | 3.06, 6.71 " |
| 1850 | 29.7 | +6.1 | 46.3 | 10.6 | 35.7 | 5 | 1.25 | 8 | ... | N 37 W | 0.65, 5.80 " |
| 1851 | 25.3 | +1.9 | 43.2 | -12.8 | 56.0 | 4 | 1.27 | 10 | ... | N 37 W | 3.2, 7.69 " |
| 1852 | 18.4 | -5.2 | 37.3 | -7.0 | 44.3 | 0 | 0.06 | 19 | ... | N 68 W | 3.11, 7.67 " |
| 1853 | 23.6 | +0.6 | 40.9 | -6.6 | 47.5 | 1 | 0.29 | 6 | ... | N 27 W | 2.52, 6.34 " |
| 1854 | 23.0 | -0.0 | 45.2 | -4.3 | 49.5 | 7 | 1.27 | 11 | ... | N 77 W | 2.41, 6.91 " |
| 1855 | 25.9 | +2.3 | 48.2 | -4.7 | 52.9 | 5 | 0.52 | 13 | ... | N 73 W | 1.9, 7.26 " |
| 1856 | 16.0 | -7.6 | 33.1 | -12.1 | 45.2 | 0 | 0.00 | 14 | ... | N 75 W | 5.2, 10.69 " |
| 1857 | 12.8 | -10.8 | 34.6 | -20.1 | 54.7 | 3 | Imp | 16 | ... | N 70 W | 4.96, 10.31 " |
| 1858 | 30.0 | +6.4 | 45.8 | 7.5 | 38.3 | 6 | 1.12 | 11 | ... | N 71 W | 2.33, 7.40 " |
| 1859 | 26.4 | +2.8 | 41.5 | -26.5 | 68.0 | 6 | 1.44 | 19 | ... | N 81 W | 3.17, 8.76 " |
| 1860 | 23.4 | +0.2 | 45.4 | -5.1 | 50.5 | 6 | 0.74 | 16 | ... | N 89 W | 6.00, 9.37 " |
| 1861 | 19.9 | -3.7 | 34.5 | -7.0 | 41.5 | 4 | 0.68 | 23 | ... | N 86 W | 2.49, 9.30 " |
| 1862 | 21.7 | +1.9 | 42.8 | -1.9 | 44.7 | 5 | 0.11 | 19 | ... | N 26 W | 2.68, 8.83 " |
| 1863 | 28.1 | +4.5 | 44.2 | -11.2 | 55.8 | 10 | 1.22 | 17 | ... | N 61 W | 1.13, 7.23 " |
| 1864 | 22.8 | +0.8 | 42.5 | -6.6 | 49.1 | 5 | 1.16 | 14 | ... | N 73 W | 6.00, 10.22 " |
| 1865 | 17.7 | -5.9 | 35.6 | -6.2 | 41.8 | 1 | 0.44 | 18 | ... | N 85 W | 4.8, 9.39 " |
| 1866 | 20.7 | -2.9 | 42.1 | -13.0 | 55.1 | 4 | 0.52 | 19 | ... | N 75 W | 2.9, 9.34 " |
| Results to 1864. | 23.61 | ... | 42.86 | -6.52 | 49.3 | 4.8 | 1.33 | 12.6 | 15.15 | N 77 W | 2.92, 8.02 |
| Exc. 1866. | -2.91 | ... | -0.76 | -6.48 | +5.72 | 0.8 | 0.80 | ... | 4.85 | ... | +1.32 |

MONTHLY METEOROLOGICAL REGISTER, AT THE PROVINCIAL MAGNETICAL OBSERVATORY, TORONTO, CANADA WEST, - FEBRUARY, 1866
 Latitude—43 deg. 39.4 min. North. Longitude—5 h. 17 min. 33 sec. West. Elevation above Lake Ontario, 108 feet.

| Day | Barom. at temp. of 32°. | | | | Temp. of the Air. | | | | Excess of mean above Normal. | | | Tens. of Vapour. | | | Humidity of Air. | | | Direction of Wind. | | | R. - sultant Direc- tion. | | | Velocity of Wind. | | R- in Rain in Inches. | Snow in Inches. | | | | |
|-----|-------------------------|--------|---------|---------|-------------------|--------|---------|-------|------------------------------|--------|---------|------------------|--------|--------|------------------|--------|--------|--------------------|--------|--------|---------------------------|------|-------|-------------------|--------|-----------------------|-----------------|--------|---------|-----------|--------|
| | 6 A.M. | 2 P.M. | 10 P.M. | MEAN. | 6 A.M. | 2 P.M. | 10 P.M. | MEAN. | 6 A.M. | 2 P.M. | 10 P.M. | ° | 6 A.M. | 2 P.M. | 10 P.M. | 6 A.M. | 2 P.M. | 10 P.M. | 6 A.M. | 2 P.M. | 10 P.M. | R. | S. | D. | 6 A.M. | | | 2 P.M. | 10 P.M. | Re- sult. | M.E.N. |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | 29.143 | 29.805 | 29.2400 | 29.2400 | 20.1 | 19.0 | 16.1 | 18.15 | -5.73 | .074 | .085 | .074 | .077 | 66 | 82 | 83 | 77 | W b N | W b N | W b S | N 80° W | 12.5 | 23.0 | 10.8 | 13.62 | 13.98 | ... | ... | | | |
| 2 | 310 | 253 | 2982 | 2982 | 16.5 | 21.2 | 11.8 | 16.18 | -7.67 | .076 | .079 | .063 | .073 | 83 | 70 | 86 | 81 | W b S | W b S | W b S | S 80° W | 6.0 | 17.2 | 6.0 | 10.36 | 10.50 | ... | ... | | | |
| 3 | 367 | 369 | 480 | 4140 | 14.0 | 18.7 | 13.2 | 14.58 | -9.18 | .068 | .065 | .060 | .062 | 83 | 62 | 75 | 73 | W S W | W S W | W S W | S 73° W | 12.0 | 23.0 | 18.2 | 16.78 | 17.01 | ... | ... | | | |
| 4 | 535 | 646 | — | — | 7.8 | 11.4 | — | — | — | .051 | .051 | — | — | 82 | 69 | — | — | W N W | W N W | W N W | N 69° W | 18.0 | 22.5 | 9.6 | 10.16 | 11.15 | ... | ... | | | |
| 5 | 30.084 | 30.077 | 30.0290 | 30.0290 | 1.3 | 11.8 | 14.7 | 8.07 | -14.62 | .043 | .047 | .057 | .049 | 91 | 61 | 67 | 74 | N W W | N W W | N W W | S 58° W | 4.4 | 15.0 | 20.5 | 13.95 | 14.41 | ... | ... | | | |
| 6 | 30.048 | 30.220 | 30.1633 | 30.1633 | 15.4 | 9.6 | 8.5 | 11.43 | -12.08 | .070 | .041 | .042 | .051 | 80 | 67 | 68 | 68 | N N E | N N E | N N E | N 4° W | 13.3 | 11.8 | 7.0 | 5.06 | 9.52 | ... | ... | | | |
| 7 | 30.028 | 29.815 | 29.853 | 29.853 | 18.3 | 25.9 | 27.3 | 23.77 | +0.33 | .080 | .107 | .111 | .098 | 81 | 76 | 74 | 76 | E S E | E S E | E S E | S 1° W | 6.0 | 6.0 | 6.0 | 2.42 | 3.13 | ... | ... | | | |
| 8 | 29.779 | 29.873 | 29.7042 | 29.7042 | 26.6 | 29.8 | 24.1 | 20.35 | +2.98 | .126 | .133 | .126 | .126 | 87 | 80 | 93 | 88 | W b S | W b S | W b S | S 37° E | 2.5 | 7.0 | 3.5 | 5.24 | 5.99 | ... | ... | | | |
| 9 | 671 | 574 | 5527 | 5527 | 20.1 | 26.2 | 30.2 | 25.73 | +2.47 | .098 | .116 | .132 | .120 | 91 | 82 | 84 | 86 | N b N | N b N | N b N | S 44° E | 3.8 | 6.6 | 6.5 | 4.19 | 5.15 | ... | ... | | | |
| 10 | 388 | 440 | 4518 | 4518 | 30.9 | 38.1 | 34.5 | 34.13 | +10.87 | .149 | .157 | .192 | .176 | 86 | 81 | 96 | 89 | Calin. | Calin. | Calin. | N 40° E | 0.0 | 0.0 | 4.6 | 1.56 | 2.43 | ... | ... | | | |
| 11 | 454 | 518 | — | — | 33.4 | 33.4 | — | — | — | .180 | .157 | — | — | 95 | 92 | — | — | N N W | N N W | N N W | N 15° W | 12.1 | 14.5 | 6.6 | 10.71 | 10.91 | ... | ... | | | |
| 12 | 864 | 769 | 7093 | 7093 | 24.1 | 25.9 | 21.9 | 25.33 | +0.08 | .114 | .113 | .099 | .107 | 87 | 81 | 84 | 85 | N b E | N b E | N b E | N 6° W | 9.0 | 8.0 | 12.5 | 7.82 | 8.03 | ... | ... | | | |
| 13 | 774 | 762 | 7723 | 7723 | 18.3 | 30.9 | 27.7 | 25.70 | +2.45 | .080 | .141 | .135 | .119 | 81 | 81 | 89 | 84 | N N W | N N W | N N W | N 73° W | 5.6 | 4.0 | 5.7 | 2.03 | 4.21 | ... | ... | | | |
| 14 | 453 | 149 | 2105 | 2105 | 29.8 | 35.6 | 25.0 | 28.98 | +5.72 | .154 | .169 | .138 | .141 | 93 | 77 | 91 | 87 | E S E | E S E | E S E | S 52° W | 11.0 | 10.0 | 22.0 | 12.95 | 16.02 | ... | ... | | | |
| 15 | 453 | 657 | 7093 | 7093 | 6.7 | 6.8 | — | — | -20.52 | .052 | .038 | .028 | .040 | 88 | 65 | 85 | 79 | S W W | S W W | S W W | N 62° W | 15.0 | 17.6 | 0.0 | 7.73 | 8.07 | ... | ... | | | |
| 16 | 30.070 | 30.089 | 30.0532 | 30.0532 | 7.3 | 6.0 | 3.0 | 2.68 | -20.78 | .030 | .049 | .039 | .044 | 92 | 85 | 91 | 84 | N W W | N W W | N W W | S 31° W | 5.0 | 18.8 | 26.0 | 19.19 | 19.55 | ... | ... | | | |
| 17 | 29.995 | 29.880 | 29.8893 | 29.8893 | 16.1 | 29.1 | 30.6 | 25.98 | +2.63 | .047 | .111 | .138 | .103 | 83 | 69 | 90 | 73 | S W W | S W W | S W W | S 37° W | 19.0 | 26.0 | 16.0 | 16.78 | 16.92 | ... | ... | | | |
| 18 | 819 | 624 | — | — | 25.5 | 30.6 | — | — | — | .118 | .152 | — | — | 86 | 89 | — | — | W b W | W b W | W b W | N 71° W | 2.8 | 10.4 | 10.0 | 5.98 | 6.54 | ... | ... | | | |
| 19 | 296 | 167 | 333 | 2695 | 31.6 | 34.5 | 25.2 | 29.47 | +5.93 | .170 | .149 | .115 | .111 | 96 | 75 | 85 | 87 | S W W | S W W | S W W | N 57° W | 0.0 | 15.0 | 1.0 | 4.89 | 7.31 | ... | ... | | | |
| 20 | 438 | 579 | 6397 | 6397 | 21.2 | 19.4 | 15.4 | 19.44 | -4.05 | .105 | .093 | .070 | .091 | 93 | 89 | 80 | 85 | Calin. | Calin. | Calin. | N 87° W | 0.0 | 5.0 | 2.2 | 3.67 | 5.34 | ... | ... | | | |
| 21 | 989 | 825 | 9238 | 9238 | 5.3 | 28.4 | 30.9 | 23.67 | -0.17 | .046 | .169 | .137 | .112 | 82 | 60 | 79 | 79 | Calin. | Calin. | Calin. | S 6° E | 0.0 | 5.0 | 2.2 | 3.67 | 5.34 | ... | ... | | | |
| 22 | 771 | 766 | 7817 | 7817 | 36.7 | 42.8 | 38.9 | 40.07 | +16.25 | .120 | .186 | .194 | .184 | 87 | 67 | 81 | 76 | S W W | S W W | S W W | S 39° W | 19.0 | 10.0 | 13.5 | 6.90 | 8.77 | ... | ... | | | |
| 23 | 766 | 598 | 6677 | 6677 | 36.7 | 43.0 | 40.3 | 40.03 | +16.10 | .188 | .174 | .246 | .201 | 86 | 62 | 88 | 82 | N b E | N b E | N b E | S 37° E | 6.0 | 3.0 | 2.0 | 1.84 | 4.56 | ... | ... | | | |
| 24 | 203 | 518 | 3637 | 3637 | 40.3 | 32.0 | 28.0 | 33.07 | +8.93 | .246 | .158 | .131 | .171 | 98 | 87 | 86 | 88 | S W W | S W W | S W W | N 75° W | 7.0 | 15.8 | 20.2 | 14.28 | 16.06 | ... | ... | | | |
| 25 | 836 | 977 | — | — | 9.3 | 10.4 | — | — | -0.08 | .055 | .065 | .055 | .058 | 84 | 78 | 88 | — | N W W | N W W | N W W | N 64° W | 25.0 | 23.0 | 5.2 | 13.69 | 14.06 | ... | ... | | | |
| 26 | 30.318 | 30.272 | 30.2290 | 30.2290 | 0.8 | 14.3 | 15.8 | 10.43 | -14.10 | .040 | .065 | .065 | .058 | 96 | 78 | 73 | 81 | Calin. | Calin. | Calin. | S 47° W | 0.0 | 13.0 | 3.3 | 5.04 | 5.56 | ... | ... | | | |
| 27 | 29.975 | 30.004 | 30.077 | 30.077 | 19.4 | 32.7 | 22.3 | 24.98 | +0.25 | .087 | .128 | .094 | .105 | 83 | 68 | 78 | 78 | S S W | S S W | S S W | S 87° W | 4.6 | 2.2 | 6.0 | 3.53 | 4.20 | ... | ... | | | |
| 28 | 30.054 | 29.982 | 29.877 | 29.877 | 20.9 | 30.9 | 32.0 | 30.48 | +5.58 | .130 | .149 | .157 | .142 | 82 | 86 | 87 | 83 | N b W | N b W | N b W | S 83° E | 5.8 | 10.4 | 6.5 | 8.87 | 9.63 | ... | ... | | | |
| 29 | 7183 | 29.690 | 29.7066 | 29.7066 | 10.70 | 25.63 | 22.43 | 22.51 | -1.16 | .104 | .112 | .112 | .103 | 86 | 75 | 83 | 81 | — | — | — | — | 8.26 | 12.19 | 9.07 | 9.40 | 8.30 | ... | ... | | | |

REMARKS ON TORONTO METEOROLOGICAL REGISTER FOR FEBRUARY, 1866.

Note.—The monthly means do not include Sunday observations. The daily means, excepting those that relate to the wind, are derived from six observations daily, namely at 6 A.M., 8 A.M., 2 P.M., 4 P.M., 10 P.M., and midnight. The means and resultants for the wind are from hourly observations.

Highest Barometer..... 30.364 at 10 a.m. on 26th } Monthly range =
 Lowest Barometer..... 29.126 at 4 p.m. on 14th } 1.238 inches.
 Maximum Temperature..... .45° on } Monthly range =
 Minimum Temperature..... .-8° on } 53°0
 Mean maximum Temperature..... 33°61 } Mean daily range =
 Mean minimum Temperature..... 18°12 } 15°49
 Greatest daily range..... 38°1 from a.m. of 21st to a.m. of 22nd.
 Least daily range..... 2°7 from a.m. to noon of 1st.
 Warmest day..... 22nd..... 40°07 } Difference = 37°49
 Coldest day..... 16th..... Mean temperature..... 2°58 }
 Maximum { Solar..... 112°0 on 20th } Monthly range =
 Radiation { Terrestrial..... -16°5 on 16th } 128°5
 Aurora observed on 3 nights, viz:—12th, 16th, and 20th.
 Possible to see Aurora on 11 nights; Impossible on 17 nights.
 Snowing on 12 days; depth 16.9 inches; duration of fall 64.9 hours.
 Raining on 3 days; depth 0.830 inches; duration of fall 20.0 hours.
 Mean of cloudiness = 0.82.
 Most cloudy hour observed, 2 p.m.; mean = 0.85; least cloudy hour observed,
 10 p.m.; mean = 0.73.

Sums of the components of the Atmospheric Current, expressed in miles.

| | | |
|---|--------|---------|
| North. | East. | West. |
| 1451.68 | 621.45 | 4021.73 |
| 2049.91 | | |
| Resultant direction S. 80° W.; Resultant velocity 5.14 miles per hour. | | |
| Mean velocity..... 9.40 miles per hour. | | |
| Maximum velocity..... 30.0 miles, from 6 to 7 p.m. of 16th. | | |
| Most windy day..... 16th..... Mean velocity, 19.55 miles per hour. } Difference = | | |
| Least windy day..... 10th..... Mean velocity, 2.43 ditto } 17.12 miles. | | |
| Least windy hour..... noon..... Mean velocity, 12.40 ditto } Difference = | | |
| Least windy hour..... 3 a.m..... Mean velocity, 5.86 ditto } 5.64 miles. | | |

2nd. Midnight, Lunar Corona.
 12th. Solar halo during forenoon.
 24th. Dense fog, a.m.
 27th. Lunar halo, 9 p.m.

February, 1866, was comparatively cold, dry, and windy.

COMPARATIVE TABLE FOR FEBRUARY.

| YEAR. | TEMPERATURE. | | | RAIN. | | SNOW. | | WIND. | | |
|------------------|--------------|-----------------------|----------------|----------------|--------------|---------|--------------|---------|--------------------------|-------------------------|
| | Mean. | Excess above average. | Max. observed. | Min. observed. | No. of days. | Inches. | No. of days. | Inches. | Resultant Direction, Vy. | Mean Force or Velocity. |
| 1840 | 28.0 | + 5.0 | 49.1 | - 8.3 | 8 | 1. | 6 | ... | ... | 0.61 lbs. |
| 1841 | 22.4 | + 0.4 | 43.4 | - 0.3 | 1 | Inap. | 9 | ... | ... | 1.03 |
| 1842 | 26.9 | + 3.9 | 48.7 | 2.5 | 8 | 3.62 | 9 | ... | ... | 0.43 |
| 1843 | 14.5 | + 3.9 | 37.5 | - 10.2 | 1 | 0.47 | 21 | 14.4 | ... | 0.43 |
| 1844 | 26.0 | + 3.0 | 47.1 | - 0.4 | 4 | 0.45 | 7 | 10.0 | ... | 0.49 |
| 1845 | 26.0 | + 3.0 | 46.6 | - 3.9 | 5 | Inap. | 9 | 19.0 | ... | 0.65 |
| 1846 | 20.4 | + 2.4 | 41.4 | - 16.2 | 0 | 0.00 | 13 | 46.1 | ... | 0.63 |
| 1847 | 21.5 | + 1.5 | 42.2 | - 1.0 | 2 | 0.55 | 13 | 27.3 | ... | 0.63 |
| 1848 | 26.6 | + 3.1 | 46.9 | - 0.6 | 4 | 0.77 | 8 | 10.8 | N 65° W | 2.53 5 6 mls. |
| 1849 | 19.5 | + 3.7 | 41.1 | - 9.2 | 5 | 0.24 | 13 | 19.2 | N 41° W | 1.48 6.58 |
| 1850 | 26.0 | + 3.0 | 49.2 | 1.3 | 7 | 1.23 | 9 | 23.1 | N 80° W | 3.43 7.61 |
| 1851 | 27.6 | + 4.6 | 50.2 | 1.3 | 7 | 2.60 | 1 | 2.4 | N 61° W | 1.49 6.94 |
| 1852 | 23.4 | + 0.4 | 41.2 | - 3.2 | 4 | 0.65 | 11 | 15.0 | N 75° W | 3.31 6.42 |
| 1853 | 24.1 | + 1.1 | 43.4 | - 0.6 | 4 | 1.03 | 15 | 12.6 | N 49° E | 2.51 7.30 |
| 1854 | 21.1 | + 1.4 | 42.7 | - 5.7 | 5 | 1.43 | 15 | 18.0 | N 7° E | 1.73 6.91 |
| 1855 | 15.4 | + 7.6 | 37.3 | - 25.0 | 2 | 1.71 | 14 | 21.8 | N 40° W | 4.31 8.17 |
| 1856 | 15.7 | + 7.1 | 35.3 | - 18.7 | 0 | 0.00 | 8 | 9.7 | N 81° W | 7.70 10.71 |
| 1857 | 28.5 | + 5.5 | 51.2 | - 5.9 | 11 | 3.05 | 11 | 11.7 | N 78° W | 3.68 9.82 |
| 1858 | 17.0 | + 6.0 | 40.9 | - 6.6 | 1 | Inap. | 16 | 26.7 | N 72° W | 3.22 9.12 |
| 1859 | 26.0 | + 3.0 | 43.3 | - 3.9 | 6 | 0.45 | 14 | 8.3 | N 51° W | 2.72 8.50 |
| 1860 | 22.8 | + 0.2 | 44.1 | - 8.4 | 7 | 1.33 | 13 | 18.8 | N 61° W | 3.28 8.73 |
| 1861 | 26.1 | + 3.1 | 44.6 | - 20.4 | 4 | 0.81 | 17 | 29.7 | N 77° W | 3.86 10.52 |
| 1862 | 22.5 | + 0.5 | 35.6 | - 3.7 | 3 | 0.18 | 17 | 23.1 | N 55° W | 3.93 8.58 |
| 1863 | 22.4 | + 0.4 | 38.9 | - 19.8 | 7 | 1.45 | 12 | 22.0 | N 23° W | 2.29 10.13 |
| 1864 | 21.3 | + 1.3 | 43.9 | - 13.0 | 2 | 0.30 | 4 | 9.5 | N 84° W | 6.48 10.11 |
| 1865 | 22.4 | + 0.1 | 41.0 | - 7.0 | 5 | 0.81 | 11 | 16.8 | N 23° W | 3.25 8.23 |
| 1866 | 22.5 | + 0.5 | 45.0 | - 8.0 | 3 | 0.83 | 12 | 16.9 | N 80° W | 5.14 9.0 |
| Results to 1864. | 22.99 | ... | 43.59 | - 6.88 | 1.2 | 1.000 | 11.9 | 18.07 | N 70° W | 3.15 8.34 |
| Excess for 1866. | 0.46 | ... | 1.41 | - 1.12 | 1.2 | 0.171 | 0.1 | 1.15 | | + 1.06 |

