

during which the cub protrudes the head from the belly of the mother, in order to browse, and withdraws it afterwards. Desirous of being better informed, I asked the people of Siraf and Oman, who visited this country, as well as merchants whom I had met in India. They all told me that the rhinoceros breeds just like the cow and the buffalo; and I do not know where El Djahiz has found this story, whether among his reading, or from his inquiries." This is evidently an obscure tradition about the Australian kangaroo, which had reached some part of Asia, and was connected with the rhinoceros by people who knew nothing about either of the two animals. Has the attention of zoologists been called to this story before?

Heidelberg, Germany,
December 5.

C. R. OSTEN SACKEN.

On an Undescribed Rudimentary Organ in Human Attire.

LECTURERS who are tired of the cockade hat-ribbon and tail buttons, may be glad to know of the following rudiment. The old-fashioned double eye-glass was a folder, with a knob at the outer side of the distal glass; and this on folding locked against a pin on the outer side of the proximal glass. The double eye-glass of the present day does not fold; but, none the less, is the knob outside the distal glass retained for it, though there is no pin to lock with on the proximal glass. How long will it take before this useless rudiment disappears? What will be the cause of its disappearance? As panmixia is out of the question, we may prophesy that it will be economy of material.

Cork, December 12.

MARCUS HARTOG.

EARLY ASTERISMS.¹

III.

The Constellations referred to in the Myth of Marduk and Tiāmat.

WE are indebted to the myth, then, for the knowledge that when it was invented the constellations Bull, Scorpion, Goat, and Fishes had been established.

This argument is strengthened by the following considerations suggested by Jansen:—

"We look in vain among the retinue of Tiāmat for an animal corresponding to the constellations of the zodiac to the east of the vernal equinox. This cannot be accidental. If therefore we contended that the cosmogonic legends of the Babylonians stood in close relationship to the phenomena of sunrise on the one hand and the entrance of the sun into the vernal equinox on the other; that, in fact, the creation legends in general reflect these events, there could not be a more convincing proof of our view than the fact just mentioned. The three monsters of Tiāmat, which *Marduk* overcomes, are located in the 'water-region' of the Heavens, which the Spring Sun *Marduk* 'overcomes' before entering the (ancient) Bull. If, as cannot be doubted, the signs of the zodiac are to be regarded as symbols, and especially if a monster like the goat-fish, whose form it is difficult to recognise in the corresponding constellation, can only be regarded as a symbol, then we may assume without hesitation that at the time when the Scorpion, the Goat-Fish, and the Fish were located as signs of the zodiac in the water-region of the sky, they already played their parts as the animals of Tiāmat in the creation legends. Of course they were not taken out of a complete story and placed in the sky, but conceptions of a more general kind gave the first occasion. It does not follow that all the ancient myths now known to us must have been available, but certainly the root-stock of them, perhaps in the form of unsystematic and unconnected single stories and concepts."

There is still further evidence for the constellation of the Scorpion.

Jensen remarks:—

¹ Continued from vol. xlviii. p. 520.

"A Scorpion-Man plays also another part in the cosmology of the Babylonians. The Scorpion-Man and his wife guard the gate leading to the Māšu mountain(s), and watch the sun at rising and setting. Their upper part reaches to the sky, and their *irtu* (breast?) to the lower regions (Epic of Gistubar 60,9). After Gistubar has traversed the Māšu Mountain, he reaches the sea. This sea lies in the east or south-east. However obscure these conceptions may be, and however they may render a general idea impossible, one thing is clear, that the Scorpion-Men are to be imagined at the boundary between land and sea, upper and lower world, and in such a way that the upper or human portion belongs to the upper region, and the lower, the Scorpion body, to the lower. Hence the Scorpion-Man represents the boundary between light and darkness, between the firm land and the water region of the world. *Marduk*, the god of light and vanquisher of Tiāmat, i.e. the ocean, has for a symbol the Bull=Taurus, into which he entered in spring. This leads almost necessarily to the supposition that both the Bull and the Scorpion were located in the Heavens at a time when the sun had its vernal equinox in Taurus and its autumnal equinox in Scorpio, and that in their principal parts or most conspicuous star groups; hence probably in the vicinity of Aldebaran and Antares, or at an epoch when the principal parts of Taurus and Scorpio appeared before the sun at the equinoxes."

If my suggestion be admitted that the Babylonians dealt not with the daily fight but with the yearly fight between light and darkness—that is, the antithesis between day and night was expanded into the antithesis between the summer and winter halves of the year; then it is clear that at the vernal equinox Scorpio setting in the west would be watching the sunrise; at the autumnal equinox rising in the east, it would be watching the sunset; one part would be visible in the sky, one below the horizon in the celestial waters. If this be so all obscurity disappears, and we have merely a very beautiful statement of a fact, from which we learn that the time to which the fact applied was about 3000 B.C., if the sun were then near the Pleiades.

Jensen in the above-quoted passages by implication, and in a subsequent one directly, suggests that not all the zodiacal constellations were established at the same time. The Babylonians apparently began with the easier problem of having six constellations instead of twelve. For instance, we have already found that to complete the present number, between

Scorpio.	Capricornus.	Pisces.
we must interpolate		
Sagittarius.	Aquarius.	

Aries and Libra seem also to be late additions according to Jensen, who writes:—

"We have already above (p. 90), attempted to explain the striking phenomenon that the Bull and Pegasus, both with half bodies only, *ἡμίτομοι*, enclose the Ram between them, by the assumption that the latter was interposed later on, when the sun at the time of the vernal equinox stood in the hind parts of the Bull, so that this point was no longer sufficiently marked in the sky. Another matter susceptible of a like explanation may be noted in the region of the sky opposite to the Ram and the Bull. Although we cannot doubt the existence of an eastern balance, still, as already remarked (p. 68), the Greeks have often called it *χῆλαι* 'claws' (of the Scorpion), and according to what has been said above (p. 312), the sign for a constellation in the neighbourhood of our Libra reads in the Arsacid inscription 'claw(s)' of the Scorpion. These facts are very simply explained on the supposition that the Scorpion originally extended into the region of the Balance, and that originally α and β Libræ represented the 'horns'

of the Scorpion, but later on, when the autumnal equinox coincided with them, the term Balance was applied to them. Although this was used as an additional name, it was only natural that the old term should still be used as an equivalent. But it also indicates the great age of a portion of the zodiac."

Let us suppose that what happened in the case of Aries and Libra happened with six constellations out of the twelve, *in other words, that the original zodiac consisted only of six constellations.* We should have—

Taurus	Crab (or Tortoise)	Virgin (or ear of corn)	Scorpion	Capricornus	Pisces
<i>Gemini</i>		<i>Lion</i>	<i>Libra</i>	<i>Sagittarius</i>	<i>Aquarius</i>
					<i>Aries</i>

The upper list not only classifies in an unbroken manner the Fish-Man, the Goat-Fish, the Scorpion-Man, and Marduk of the Babylonians, but we pick up all or nearly all of the ecliptic stars or constellations met with in early Egyptian mythology, Apis, the Tortoise,¹ Min, Selk, Chnemu as represented by appropriate symbols.

Further, the remarkable suppression or small representation of the Lion in both the more ancient Babylonian and Egyptian mythology is explained. I have shown before how the Babylonians with an equinoctial year would take slight account of the solstice, while it also follows that the Egyptians, who were wise enough not to use zodiacal stars for their warnings of sunrise for the reason that stars in the brighter light of dawn near the sun are more difficult to see, might easily neglect the constellation of the Lion as first Phact and then Sirius, both southern stars, marked for them the advent of the summer solstice; on different grounds, then the Lion might well have been at first omitted in both countries.

Since there is a doubt as to the existence of the Lion among the first Babylonian constellations,² the argument in the following paragraph would appear to refer to observations made at a later time when totemism was less prevalent:—

"The Lion in the heavens must represent the heat of the summer. He does this most effectually when the summer solstice coincides with the constellation, that is, when its principal stars appear before the sun at the summer solstice. This happened at the time when the vernal equinox lay in Taurus, and when the principal star-group of the Bull appeared before the sun at the time of the vernal equinox. The water-jug (Amphora)—Aquarius must represent symbolically the watery season of winter. It does this most effectually when the winter solstice coincides with it, or its principal star-group appears before the sun at the winter solstice. This happened about the time when the vernal equinox lay in Taurus, and its principal star-group rose before the sun at the time of the vernal equinox."

The above suggested basis of the Babylonian mythology, regarding the demons of Tiāmat, established when the sun was in Taurus at the spring equinox, enables us to understand clearly the much later (though similar) imagery employed when the sun at the equinox had passed from Taurus to Aries—when the Zend Avesta was written, and after the twelve zodiacal constellations had

been established. We find them divided equally into the kingdoms of Ormuzd and Ahriman. Here I quote Dupuis:¹

"L'agneau est aux portes de l'empire du bien et de la lumière, et la balance à celles du mal et des ténèbres; l'un est le premier des signes supérieurs, et l'autre des signes inférieurs.

"Les six signes supérieurs comprennent les six mille de Dieu, et les six signes inférieurs les six mille du diable. Le bonheur de l'homme dure sous les premiers signes, et son malheur commence au septième, et dure sous les six signes affectés à Ahriman, ou au chef des ténèbres.

"Sous les six signes du règne du bien et de la lumière qui sont agneau, taureau, gémeaux, cancer, lion et vierge ou épi nous avons marqué les états variés de l'air et de la terre, qui sont le résultat de l'action du bon principe. Ainsi on lit sous l'agneau ou sous le premier mille ces mots, printemps, zephyr, verdure; sous le taureau, sève et fleur; sous les gémeaux, chaleurs et longs jours; sous le cancer, été, beaux temps; sous le lion, épis et moissons; et sous la vierge, vendages.

"On passant à la balance, on trouve les fruits; là commence le règne du mal aussitôt que l'homme vient à cueiller les pommes. La nature quitte sa parure; aussi nous avons écrit ces mots. Dépouillement de la nature, sous le scorpion on lit froid; sous le sagittaire, neiges; sous le capricorne, glace et brouillard, siège des ténèbres et de long nuits; sous le verseau, pluies et frimas; sous les poissons, vents impétueux."

We now return for a moment to Ia.

Associated with Ia was an Ia-star, which Jensen concludes may be η Argûs. This we must consider.

Jensen concluded that the Ia-star is η Argûs, on the ground that many of the texts suggest a darkening of it now and again; he next proceeds to point out that a variability in the star is the only point worth considering in this connection, and by this argument he is driven to η , which is one of the most striking variables in the heavens, outshining Canopus at its maximum. Speaking generally, everybody would agree that observation by clouds, &c., would not be recorded, but if the star were observed just rising above the southern horizon only, then its absence, due to such causes, would, I should fancy, be chronicled, and it must not be forgotten that this is precisely the place where it would be observed, for in the first place it was to the south of the heavens, what Bil was to the north, and the temple sacred to it at Babylon was oriented to the south.

But η Argûs never rose or set anywhere near the south. I have ascertained that its declination was approximately $33\frac{1}{2}^\circ$ S. in 6000 B.C., and increased to 40° S. by about 2000 B.C. Hence between these dates at Eridu its amplitude varied between 38° and 47° S. of E. or W. Now here we are far away from the S. point, though very near the S.E. or S.W. point, to which it is stated the Babylonian structures had their sides oriented.

The question arises whether there was a star which answers the other conditions. There was a series of such stars. First, beginning with the most recent; we have *Canopus*. 6000 B.C. its declination was $62\frac{1}{2}^\circ$, it would then have been below the horizon of Eridu, first making its appearance with a declination of 59° nearly at the south point in 4700 B.C. Phact would follow in 5400 B.C. Achenar would make a similar appearance for the first time about 8000 B.C. It may be here mentioned generally that the precessional movement must, after certain intervals, cause this phenomenon to be repeated constantly with one star after another. May this explain the "other animals" who subsequently appeared like Ia (Oannes)? The whole myth is, I think, clearly one relating to men coming (from the south?) to Eridu in ships. The boat is turned into a "fish man," and the

¹ I think I am right about the Tortoise, for I find the following passage in Jensen, p. 65, where he notes the absence of the Crab:—"Ganz absehend davon, ob dasselbe für unsere Frage von Wichtigkeit werden wird oder nicht, muss ich daran erinnern, das unter den Emblemen, welche die sogenannten "Deeds of Sale" häufig begleiten, verschiedene Male wie der Scorpion so die Schildkröte abgebildet gefunden wird. . . ."

² Jensen, p. 314.

"Origine des Cultes," vol. vii. p. 82.

star to which they pointed to show whence they came or made a god.

It will have been gathered that the constellations of the Bull and the Scorpion were recognised as such at the same early date both in Babylonia and Egypt, and this of course implies intercommunication.

The ecliptic stars in use in Babylonia in later times are as follows² :—

1. η Piscium.	15. α Leonis.
2. β Arietis.	16. ρ Leonis.
3. α Arietis.	17. β Leonis.
4. η Tauri.	18. β Virginis.
5. α Tauri.	19. γ Virginis.
6. β Tauri.	20. α Virginis.
7. ζ Tauri.	21. α Liliæ.
8. η Geminorum.	22. β Liliæ.
9. μ Geminorum.	23. δ Scorpionis.
10. γ Geminorum.	24. α Scorpionis.
11. α Geminorum.	25. δ Ophiuchi.
12. β Geminorum.	26. α Capricornis.
13. δ Cancri.	27. γ Capricornis.
14. ϵ Leonis.	28. η Capricornis.

With regard to the complete ecliptic, the information seems meagre both from Babylonia and from Egypt in early times.

As to later times in Babylonia—say 1000 B.C.—the following list represents the results of Jensen's investigations :—

- (1) Perhaps Aries (= "leading sheep").
- (2) A "Bull (of the Heavens)" = Aldebaran or (and) = our Taurus.
- (3) Gemini.
- (4) ?
- (5) Perhaps Leo.
- (6) The constellation of the "corn in ears" = the ear of corn. [Spica.]
- (7) Probably Libra, whose stars are, however, at least in general, called "the claw(s)" (*i.e.* of the Scorpion).
- (8) The Scorpion.
- (9) Perhaps Sagittarius.
- (10) The "goat fish" = caper.
- (11) ?
- (12) The "Fish" with the "Fish band."

In Egypt we find no such sharp references as the above to either the poles or the great circles, but dating from the twentieth dynasty (1100 B.C.), and therefore almost contemporaneous, is a series of star tables which have puzzled Egyptologists from Champollion and Biot downwards.

Looking at them they seem to be observations of stars made during the twelve hours of the night on the 1st and 16th of every month. The chief stars seem to be twenty-four in number, and it looked at first as if we had really here a list of priceless value of twenty-four either ecliptic or equatorial stars.

Unfortunately, however, the list has resisted all efforts to completely understand it. Whether it is a list of risings or meridian passages even is still in dispute. Quite recently, indeed, one of the investigators, Herr Gustav Bilfinger,³ has not hesitated to consider it not a list of observations at all, but a compilation for a special purpose.

"The star-table is intended to carry the principle of time into the rigid world of the grave, and represents over the sepulchral vault, 'the eternal horizon' as the ancient Egyptians so aptly styled the grave, an imitation of the sky, a compensation for the sky of the upper world with its time-measuring motion; yet the idea here is bolder, the execution is more artificial and complicated, since the sculptor endeavoured to combine the daily and the annual motion of the celestial vault in *one* picture; wanted to transfer into the grave the temporal frames in which all human life is enacted. This endeavour to represent by one configuration both motions and both

chronological units explains all the peculiarities and imperfections of our star-table.

"The simplest means of representing both motions was found in the stars, which circle the earth in the course of a day and indicate the year by the successive appearance of new stars in the morning twilight. If the same stars were to serve both purposes in one representation, it was necessary to take twenty-four stars which rose at intervals of fifteen days, since only such followed each other at an average distance of 15° , and were therefore useful for showing the hours."

"If the calendar-maker really possessed a list of the twenty-four principal (zodiacal) stars, the course of the year was indicated thereby; but since he also wanted to represent the daily motion, he might with some justice have composed each night out of eleven of these stars, since the stars' risings are only visible during the ten middle hours of the night. But ten hours would not have adequately represented the night, since this was thought of as a twelve hours' interval.

"There was a way out of it, viz. to call hora 0 'sun-set,' hora 12 'sunrise,' which would have been a simple and correct solution if the division of the night into twelve parts for practical purposes had been aimed at. But this expedient he could not adopt, because he could or would only operate with stars, and the notions of sunrise and sunset found no place in his tables. Thus he was forced to *falsify* the customary division of the hours, by squeezing the twelve hours of the night into the time during which star risings are visible, viz. the dark night exclusive of twilight. On the other hand he could not, with his principal stars at intervals of 15° , divide his night, shortened as it was by two hours, into twelve parts, and thus he was obliged to make use of two or three auxiliary stars, as we have proved in detail above, and thus yet more to disfigure the hour-division, since thereby the lengths of the hours were made very variable. These are then two things which we must not regard as peculiarities of ancient Egyptian reckoning, but as a consequence of the leading idea of our table, which did not intend to facilitate the division of the night into twelve parts by star observations, but was calculated by the connection of thirteen stars with thirteen successive moments to create the idea of the circling host of stars and thence the course of the night."

I give an abstract of the list of the twenty-four principal stars and the constellations in which they occur :—

1. Sahu = Orion.
2. Gothis = Sirius.
3. The two stars.
4. The stars of the water.
5. The lion.
6. The many stars.
7. Mena's herald.
8. Mena.
9. Mena's followers.
- 10.
- 11.
12. Hippopotamus.
- 13.
- 14.
- 15.
- 16.
17. Necht.
- 18.
- 19.
- 20.
21. Ari.
22. } Goose.
23. }
24. Sahu = Head of Orion.

It will be seen that this Egyptian star list is very indeterminate, but there are other lists, which are much more definite, represented by the Indian Nakshatras, the Arab Manāzil al-Kamar, and the Chinese Sieu.

¹ For the story as told by Bérôssas, see Sayce, p. 131.

² "Astronomisches aus Babylon," pp. 117-133.

³ "Die Stern Tafeln in den ägyptischen Königsgräbern von Bibân el Molâk,"—von Gustav Bilfinger (p. 69).

Hindu Asterism.	Arab Manzil.	Chinese Sieu.
1. Açvinî (The two gods) β and γ Arietis	1. ash-Sharatân (The two signs) β and γ Arietis	1. Mao η Tauri
2. Bharanî (Carrying away) 35, 39, and 41 Arietis	2. al-Buṭain (The little belly) 35, 39, and 41 Arietis	2. Pi ε Tauri
3. Kṛttikâ (Has been explained as matting ; doubtful) η Tauri, &c. (Pleiades)	3. ath-Thuraiyâ (Probably "the cluster") η Tauri, &c. (Pleiades)	3. Tse λ Orionis
4. Rohinî (Red) α, θ, γ, δ, ε Tauri	4. ad-Dabarân ("The follower" of the Plei- ades) α, θ, γ, δ, ε Tauri	4. Tsan δ Orionis
5. Mrgaçiras (Head of deer) λ, φ ¹ , φ ² Orionis	5. al-Hak'ah (The circle of hairs) λ, φ ¹ , φ ² Orionis	5. Tsing (A well) μ Geminorum
6. Ârdrâ (Damp) α Orionis	6. al-Han'ah (Apparently "the wishing As- terism") η, μ, ν, γ, ξ Geminorum	6. Kuei θ Cancri
7. Punarvasu (Twice bright) β, α Geminorum	7. adh-Dhirâ' (The arm) β, α Geminorum	7. Lieu (The willow) δ Hydræ
8. Pushya (Auspicious) θ, δ, γ Cancri	8. an-Nathrah ("The point between lip and nostrils" of Leo) γ, δ Cancri, and Præsepe	8. Sing (A star) α Hydræ
9. Âçleshâ (Embracing, serpents) ε, δ, σ, η, ρ Hydræ	9. at-Tarf ("The eyes" of Leo) ξ Cancri, λ Leonis	9. Chang ν ¹ Hydræ
10. Maghâ (The strong?) α, η, γ, ζ, μ, ε Leonis	10. aj-Jabhah (The forehead) α, η, γ, ζ Leonis	10. Y α Crateris
11. Pûrva Phalgunî (Grey) δ, θ Leonis	11. az-Zubrah (The shoulder) δ, θ Leonis	11. Chin γ Corvi
12. Uttara Phalgunî β, 93 Leonis	12. aš-Šarfah ("The change" of weather) β Leonis	12. Kio (A horn) α Virginis
13. Hasta (Hard) δ, γ, ε, α, β Corvi	13. al-Auwâ ("The howler," sometimes con- ceived as a dog barking round Virgo) β, η, γ, δ, ε Virginis	13. Kang (Overbearing, strong) κ Virginis
14. Citrâ (Beautiful) α Virginis	14. as-Simâk (The prop) α Virginis	14. Ti (A foundation) α ² Libræ
15. Svâtî α Bootis	15. al-Ghafr (Of uncertain sense) ι, κ, λ Virginis	15. Fang (Room, dwelling) π Scorpionis
16. Viçâkhâ (Fork) ι, γ, β, α Libræ	16. az-Zubânân ("The two claws" of the scorpion) α, β Libræ	16. Sin (The heart) σ Scorpionis
17. Anurâdhâ (Blissful) δ, β, π Scorpionis	17. al-Iklîl (The crown) β, δ, π Scorpionis	17. Uei (High) μ ² Scorpionis
18. Jyeshthâ (The best) α, σ, τ Scorpionis	18. al-Ḳalb (The heart) α Scorpionis	18. Ki γ ² Sagittarii
19. Mûla (Root) λ, ν, κ, ι, θ, η, ζ, μ, ε Scorpionis	19. ash-Shaulah ("The sting" of the scorpion) λ, ν Scorpionis	19. Teu φ Sagittarii
20. Pûrva-Ashâdhâ (Unconquered) δ, ε Sagittarii	20. an-Na'aim (The ostriches) γ ² , δ, ε, η, φ, σ, τ, ζ Sagittarii	20. Nieu β Capricorni
21. Uttara-Ashâdhâ (Unconquered) σ, ζ Sagittarii	21. al-Baldah (The hairless space between the eyebrows) N of π Sagittarii	21. Nü ε Aquarii
22. Abhijit (Victorious) α, ε, ζ Lyre	22. Sa'd adh-Dhâbih (Sa'd (luck) the sacrificer) α, β Capricorni	22. Hiiü β Aquarii
23. Çravana (Lame) α, β, γ Aquilæ	23. Sa'd Bula' ("Greedy Sa'd," because the larger star seems to swallow the smaller) ε, μ, ν Aquarii	23. Goei α Aquarii
24. Çravishthâ (Most glorious) β, α, γ, δ Delphini	24. Sa'd as-Sûûd ("The luck of lucks" = spe- cially lucky star β, ξ Aquarii	24. Che α Pegasi
25. Çatabbishaj (?) λ Aquarii, &c.	25. Sa'd al-Akhbiyah ("Sa'd with the tents") α, γ, ζ, η Aquarii	25. Pi γ Pegasi
26. Pûrva-Bhâdrapadâ (Having ox feet) α, β Pegasi	26. al-Fargh al-Mukdim (The front lip of the bucket) α, β Pegasi	26. Koei ζ Andromedæ
27. Uttara-Bhâdrapadâ (Having ox feet) γ Pegasi, α Andromedæ	27. al-Fargh al-Mukhir (The hinder lip of the bucket) γ Pegasi, α Andromedæ	27. Leu β Arietis
28. Revatî (The rich) ζ Piscium, &c.	28. Baṭn al-Hût (The fish's belly) β Andromedæ, &c.	28. Oei 35 Arietis

I mention these, because although their dates are uncertain, they are undoubtedly built upon a common model, they have identical functions, and they have to do with the ecliptic, that is to say, we are in each case in presence of a belt of stars to which the motions of any other heavenly body travelling round the sun or, like the planets, round the earth, like the moon can be readily referred. In these lists¹ I give translations of the Sanscrit, Arab, and Chinese names, so far as they can be made out, and I must here express my deep obligations to Profs. Max Müller, Robertson Smith, and Douglas, for their kindness in supplying them.

J. NORMAN LOCKYER.

THE SECONDARY EDUCATION MOVEMENT.

THE outcome of the Oxford Conference on Secondary Education in England is our usual panacea for social ills, a Royal Commission. As this is to be, let us hope that the reference will be restricted to some definite points, and the members to a small number of properly qualified persons. Otherwise little else than unnecessary delay will be the result. Practical experience of such Commissions tends, however, to disenchant one with the prevailing idea of their usefulness, that is, of their power to settle the question at issue. Look at the last Commission on Primary Education, containing bigwigs of every kind. How long they sat, and how many Blue Books they filled with evidence, may be learnt by those who are interested. But what did it all come to? The large majority reported that they were totally opposed to free education, and the small minority, though not opposed, saw no possibility of its accomplishment. Two years afterwards a Tory Government carried a Free Education Act! Again, a Royal Commission on Vaccination has been sitting every Wednesday for the last five years, and it has not yet finished taking evidence! In face of facts like these, and they might be greatly extended, can one look with much hope to the early settlement of so difficult and complex a question as English secondary education by a Royal Commission as usually constituted? There are two conditions under which Commissions of this kind can act usefully: first, as means of inquiry into facts, and such a one was the Technical Commission of 1881-4, which journeyed over sea and land in quest of information; and second, as a means of carrying out measures laid down by Act of Parliament; and such a one, for example, is the Scottish University Commission now sitting. If we do not now know what we want in the way of secondary education, let there be a Commission by all means. Many may think that we do know. We are all convinced that more good secondary schools are needed both in town and country; and what has to be decided are such matters as how these schools are to be governed, by whom new ones are to be set up, and old ones remodelled to suit the wants of the times, how the necessary funds are to be found, and so forth. Now, are these questions of a kind which a Royal Commission can once for all determine? I think not. In my opinion they can only be settled by the House of Commons. The rival claims of County Councils, now in possession of the funds; of School Boards, now entrusted with primary education; of existing public schools of various orders; and, lastly, of private venture schools of all sorts and sizes, cannot be met or satisfied by any report of a Royal Commission. They must be fought out on the floor of the House, and it is by no means clear that the outcome of such a struggle

will be in accordance with the recommendations which the report may contain. Therefore, desiring, as all those interested in education must do, to see the present chaos reduced to some degree of order without delay, and the crying needs at least to some extent supplied; and, knowing that there is no present prospect of Government action on such a scale as to systematise our varied forms of educational activity, I, for one, should be satisfied to get a Bill through the House of Commons consisting of two clauses, the first making the educational use of the whisky money compulsory and permanent, and the second giving County Councils power to expend such a portion as they think fit, of the funds capable of devotion to technical instruction, on the furtherance of secondary education. That an expenditure in this direction of some of the money especially voted by Parliament for technical instruction is justified by the acknowledged fact that it is impossible to carry on such instruction, except on the lowest level, to persons ignorant of the educational tools which have to be used.

But, in fact, technical instruction, as defined in the Act, is, or may be, modern secondary education, for it includes all the necessary subjects with the exception of classics and, perhaps, of English and history. So that under these Acts schools—either free or fee'd—can now be established wherever the County Councils determine, and these may be, to all intents and purposes, middle-class secondary schools. Moreover, under these Acts, the local authority may aid existing schools so as to enable them to give scientific or technical instruction. Both of these modes of action are now being widely adopted by County Councils all over the country, so that something substantial in the direction of what is needed is being done. There is, of course, considerable difference of opinion as to the best steps to be taken to bring about a complete and satisfactory system; and for the purpose of ventilating the subject, the Oxford University, in its corporate capacity, took the unprecedented step of calling a conference of the teachers of England, from the university to the elementary school, to discuss the whole question of secondary education. The gathering was remarkable in many ways, but chiefly as an admission, on the part of the universities, of the need of radical educational reform, and of the wisdom of their participation in such reforms. The papers read and the discussions held were, of course, of the multifarious and somewhat discursive order. All, however, from Dean Gregory on the one side, to Mr. Lyulph Stanley on the other, agree "that something should be done," but we may seek in vain for any consensus of opinion as to how that "something" is to be done, or even what that "something" is, except, indeed, the consignment of the matter to the tender mercies of a Royal Commission. Nevertheless, much good may come from the conference; many wise things were said, and the coming together of a large number of persons all in one way or another interested in assisting the progress of the question, cannot be without its useful effect.

What one misses chiefly in the discussion is the scientific aspect of the question. Scarcely a speaker touched upon what, I take it, is after all the gist of the whole matter, viz. the necessity, above all and under all, for an education based upon science. We have to deal, as was well said by Dr. Hewitt, of the Cheshire County Council, not with the 10 per cent. of the population to whom we teach the "humanities," but with the 90 per cent. of humanity struggling for existence. If we want to hold our own with foreign nations, we must alter, and that rapidly, and not waste our precious time too much in inquiry. With the object of raising the standard of existence for these teeming millions the nation now pays £750,000 a year, not enough, perhaps, to accomplish all we require, but amply sufficient for pre-

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